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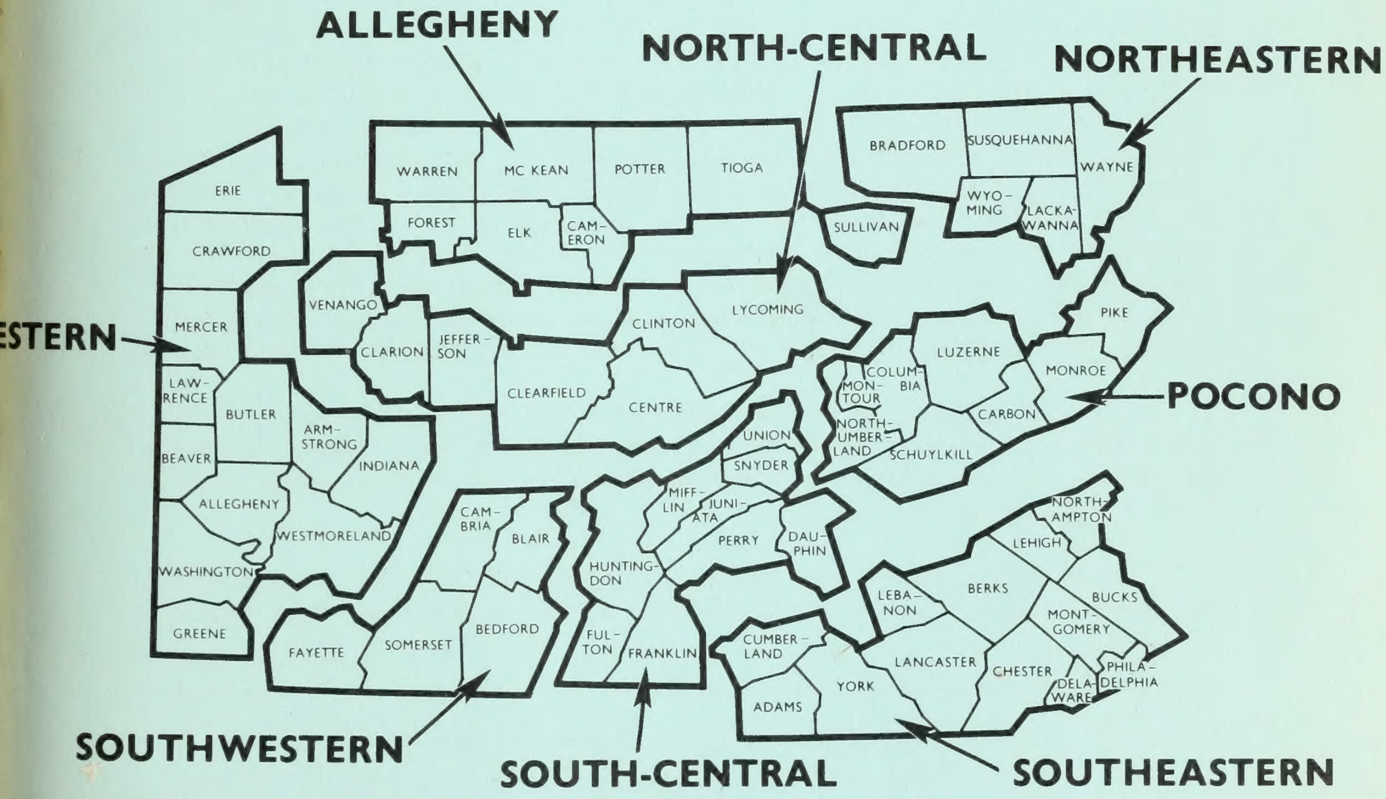

USDA Forest Service Resource Bulletin NE-65

FOREWORD

The third inventory of Pennsylvania was directed by Carl E. Mayer, Resources Evaluation unit leader. Joseph E. Barnard was responsible for the design of the inventory and sample selection. John R. Peters supervised the aerial-photo interpretation and data collection by field crews. He was assisted by Mark A. Cooper, III, Stanley L. Kobielski, James M. McGrath, James M. Miller, and Ronald L. Taylor. The other field workers were: David J. Alerich, Dennis M. Brehm, Timothy J. Breneisen, William S. Cook, Carla J. Derby, Eileen M. Doherty, Daniel J. Evans, Michael E. Glova, Stanley E. Jones, Dennis R. Kline, Susan N. Little, Kenneth M. Maleski, Pamela A. McIntosh, John L. Motzer, Gene F. Odato, Gary T. Pierotti, David T. Plunkett, William S. Ruxton, Lois M. Schimmel, Roy A. Siefert, Robert A. Smith, Alexander L. Stewart, Jr., Karen J. Sykes, Edward H. Uebler, Nancy M. Veronesi, Richard C. Whittaker, and Eric L. Wunz.

David R. Dickson applied FINSYS (Forest INventory SYStem), a generalized data-processing system, to the specific data needs of the Pennsylvania inventory, and produced summary tables for the state, geographic sampling units, and counties. Thomas W. Birch was instrumental in assuring that the area estimates were consistent with those from the two previous inventories, as well as in grouping the proper counties for detailed area and volume information. Teresa M. Bowers assisted in the inventory design by performing all calculations necessary for sample-size determination and plot selection. She was responsible for the coordination of keypunching and other data-preparation tasks. Flora C. Clements and Anne M. Malley helped to prepare and balance several of the statistical tables in this report.

James T. Bones, with the assistance of State personnel, collected and compiled the data on timber products output and timber removals. He was assisted in the compilation phase by David R. Dickson and Teresa M. Bowers.

Carmela M. Hyland was responsible for administrative and secretarial services. Catherine A. Logan typed the bulk of this report.

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FOREST STATISTICS FOR PENNSYLVANIA--1978

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INTRODUCTION

The USDA Forest Service inventories the forest resources of the Nation for assessment and planning activities authorized by the Renewable Resources Planning Act (RPA) of 1974 and the Renewable Resources Research Act of 1978. These inventories are conducted periodically in each state. Two previous inventories were conducted in Pennsylvania and reported on in 1958 and 1968. This report presents the forest resource data from the third inventory conducted in 1977-78. This inventory involved a cooperative effort of the Pennsylvania Department of Environmental Resources, Bureau of Forestry; the Allegheny National Forest; and the Northeastern Forest Experiment Station. Data from the most recent inventory of the Allegheny National Forest were updated to the present inventory date. The Bureau of Forestry conducted an intensive timber management inventory of the State Forest Lands in cooperation with the Resources Evaluation project and provided a computer data file of resource plot data to the USDA Forest Service. The Resources Evaluation project at the Northeastern Forest Experiment Station conducted an inventory on all private forest lands as well as the other public forest lands not mentioned above. The Resources Evaluation project developed the summaries of resource data and prepared this report.

The 1977-78 inventory conducted by the Resources Evaluation project followed a sampling procedure that utilized recent aerial photography, the partial remeasurement of ground samples from the earlier inventories, and the establishment of new ground sample locations. In Pennsylvania this required the remeasurement of 1,001 plots, the classification of 79,373 points on recent aerial photographs into land-use and cubic-foot volume classes, and the location and establishment of 1,743 new ground measurement locations as a subsample of the photo points. The data collected were summarized according to the Sampling with Partial Replacement (SPR) design by the FINSYS computer system developed by the Northeastern Forest Experiment Station.

The resurvey of Pennsylvania's forest resources involved several other companion studies and considerable analysis. An analytical report discussing the results of the reinventory, past trends, and future supply potentials is being prepared. Other publications describing the resource, the primary forest products industry, and the private forest-land owner are available. The forest area and timber volume statistics shown in this report are the summary of the information collected at nearly 3,500 field locations. Other information or additional summaries may be developed. If interested in either additional publications of more resource data, contact the Resources Evaluation Project, USDA Forest Service, 370 Reed Road, Broomall, PA 19008 (phone 215-461-3037).

CURRENT HIGHLIGHTS

Forest area

Pennsylvania is 58 percent forested. Ninety-five percent of the forest land, 15.9 million acres, is classified as commercial forest land.

Nearly 22 percent of Pennsylvania's commercial forest land, 3.5 million acres, is publicly owned--the highest total and percentage in the Northeast. The State has the largest holding of publicly-owned commercial forest land.

Nearly half of the commercial forest land is in sawtimber stands. Less than 2 percent is nonstocked.

Pennsylvania's forests are dominated by hardwoods. The oak-hickory and northern hardwoods forest-type groups cover 47 and 40 percent, respectively, of the commercial forest land.

Timber volume

Growing-stock volume is 21.8 billion cubic feet--an average of 1,366 cubic feet per acre. Sawtimber volume is 46.4 billion board feet--an average of 2,916 board feet per acre.

Ninety-two percent of the growing-stock volume is in hardwood species. Red maple is the species with the most volume--3.3 billion cubic feet.

Ninety-one percent of the sawtimber volume is in hardwood species. Northern red oak is the species with the most volume--7.7 billion board feet.

Thirty-seven percent of the hardwood sawtimber volume is in standard-lumber log grade 1 or 2.

Timber growth and removals

Growing-stock growth is estimated to be 2.2 times timber removals for 1977. Select white oaks is the only major species group showing removals exceeding growth.

Sawtimber growth is estimated to be 2.7 times removals for 1977. Northern red oak shows the largest annual growth of any species.

In 1976, 70 percent of timber removals from growing stock was utilized as a roundwood product. Ninety-three percent of sawtimber removals was utilized.

Sawlogs were the major timber product in 1976 and accounted for 41 percent of all growing-stock removals.

RELIABILITY OF THE ESTIMATES

Much of the data in this report were based on a carefully designed sample of forest conditions throughout the state. However, since we did not measure every tree or every acre in the state, the data are estimates. When judging the effectiveness of the estimating procedure we are concerned with two important criteria. First, how accurate is the estimate; and second, how precise or reliable is the estimate? Accuracy is the difference between the sample result and the true value or how much is really there. Reliability is the difference between a sample result and the result from a complete count or census using essentially the same definitions and procedures. We are chiefly interested in the accuracy of the sample but in most instances can only measure reliability.

We check the accuracy of our estimates as best we can. Drafts of the resource report are submitted to outside experts familiar with the resource situation. Should questions arise, the data are reviewed and reanalyzed, and discussions are held to resolve differences. We also compared our data with those provided by other agencies such as the USDA Soil Conservation Service and the Bureau of the Census. Also great care was taken in setting up the sample, carefully training field personnel, inspecting field work frequently, and checking office work.

Because of the care exercised in the survey process our estimates of reliability afford a reasonable measure of the survey's adequacy. The reliability of each estimate is given by its sampling error. An associated sampling error was calculated for each estimate in the report. Some appear in tables and all are available on request.

Here is an example of how to use sampling errors. The total growing-stock volume estimate of Pennsylvania--21,756 million cubic feet--is our best estimate. It has an associated sampling error of 0.8 percent, or 174.0 million cubic feet. This means that if there are no errors in procedure, the odds are 2 to 1 that if we repeated the survey in the same way, the resulting estimate of growing-stock volume would be between 21,582.1 and 21,930.1 million cubic feet, or 21,756.1 ± 174.0 million cubic feet. Similarly, the odds are 19 to 1 that the estimate would be ± 348.1 and 300 to 1 that it would be within ± 522.1 million cubic feet.

Because of the nature of sampling, estimates for the state totals are most reliable (that is, have the smallest sampling errors); followed by unit estimates and then county estimates. For example, our estimate of commercial forest land for the state has an associated error of 0.6 percent; the error for the Western Unit estimate is 2.3 percent; and the error for the Armstrong County estimate is 6 percent. Though the current county estimates are much improved over previous survey county estimates, they are still less reliable than the unit or statewide estimates. Resources Evaluation continues to pursue methods of providing more reliable, detailed information.

Since the 1965 survey, many definitions and procedures have changed as the result of refinements and improvements in forest inventory and data processing techniques. As a consequence, before any comparisons with the most recent information can be made, the published area and volume estimates from the previous survey must be adjusted somewhat. The adjusted area figures are shown in Table 76. Timber volume adjustments are reflected in the following figures for growing-stock volume (in millions of cubic feet):

Species group	1965	1978	Change (1965-1978)
Hemlock	708	872	+ 164
Other softwoods	719	895	+ 176
All softwoods	1,427	1,767	+ 340
Select white oaks	1,459	1,382	- 77
Select red oaks	2,334	2,598	+ 264
Other oaks	3,112	3,361	+ 249
Maples	3,860	5,361	+1,501
Black cherry	1,457	1,892	+ 435
Other hardwoods	4,203	5,395	+1,192
All hardwoods	16,425	19,989	+3,564
All species	17,852	21,756	+3,904

For sawtimber volume, adjustments for the broad species groups are reflected in the following figures (in millions of board feet, International 1/4-inch rule):

Species group	1965	1978	Change (1965-1978)
Softwoods	3,217	4,329	+ 1,112
Hardwoods	28,079	42,097	+14,018

IF YOU WANT TO COMPARE 1978 AREA AND VOLUME ESTIMATES WITH COMPARABLE ESTIMATES FOR 1965, USE THE FIGURES IN TABLE 76 AND THE ABOVE FIGURES RATHER THAN THOSE PUBLISHED PREVIOUSLY.

Making comparisons will require some simple arithmetic to derive the proper figure for 1965. For example, if you want to compare the 1965 data on growing-stock volume in poletimber stands with the 1978 data, go back to the published data for 1965 (Ferguson 1968). Table 16 shows that the growing-stock volume in poletimber stands was 5,930 million cubic feet. This represented 33.2 percent of the total growing-stock volume of 17,860 million cubic feet.

To obtain the adjusted figure, multiply the 1965 proportion by the recalculated 1965 growing stock total. The calculation is (0.332) (17,852) = 5,927.3 million cubic feet. This is the figure to use for comparison with the corresponding 1978 figure of 6,888.0 million cubic feet. Contact the Resources Evaluation unit at the Northeastern Forest Experiment Station if you need further assistance in making comparisons. A more detailed explanation of the reasons for recalculation will appear in the analytical report of Pennsylvania's forest resource.

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Table 1.--Land area by land class, Pennsylvania, 1978.

Land class	Area		
	----Thousand acres ----		Percent
Commercial forest land		15,923.7	55
Noncommercial forest land:			
Productive reserved	532.0		2
Urban	72.0		W
Unproductive[a]	298.2		1
Total noncommercial		902.2	3
Total forest land		16,825.9	58
Nonforest land:			
Cropland[b]	4,778.6		17
Pasture[b]	1,587.8		6
Other[c]	5,585.9		19
Total nonforest		11,952.3	42
Total land area[d]		28,778.2	100

[a] Includes 223,625 acres on State Forest Land in stands 10 acres or larger occupied by tree species but where site and topography are inhibiting factors. The Bureau of Forestry anticipates no management practices on these lands due to shortness of merchantable stem, excessive rocks, or steepness of terrain.

[b] Source: U.S. Dep. Commer., Bur. Census, 1980. 1978 Census of Agriculture, preliminary report. AC79-P-42-000. p.l.

[c] Includes swampland, industrial and urban areas, other nonforest land, and 114,400 acres classed as water by Resources Evaluation standards, but defined by the Bureau of the Census as land.

[d] Source: U.S. Dep. Commer., Census, 1970 Census of Population, Vol. I, and Area Measurement Reports, Series GE-20, No. 1.

W-Less than 0.5 percent.

Table 2.--Land area, by geographic unit and land class, Pennsylvania, 1978.

(In thousands of acres)

Geographic unit	Forest land					Nonforest land	All land
	Commercial	Productive-reserved	Urban	Unproductive	Total		
Western	2,534.3	77.3	20.5	22.3	2,654.4	2,952.0	5,606.4
Southwestern	1,597.1	65.6	2.0	34.0	1,698.7	938.1	2,636.8
Allegheny	3,282.2	39.8	0.6	16.3	3,338.9	654.7	3,993.6
North-Central	2,859.8	51.3	1.6	143.5	3,056.2	972.6	4,028.8
South-Central	1,642.0	63.4	2.7	66.4	1,774.5	1,179.1	2,953.6
Northeastern	1,357.3	7.0	4.1	5.2	1,373.6	913.8	2,287.4
Pocono	1,656.7	141.8	2.9	7.4	1,808.8	939.3	2,748.1
Southeastern	994.3	85.8	37.6	3.1	1,120.8	3,402.7	4,523.5
Total	15,923.7	532.0	72.0	298.2	16,825.9	11,952.3	28,778.2

Table 3.--Area of Commercial forest land, by stand-size and ownership class, Pennsylvania, 1978.

Stand-size class	National Forest	Other public	Forest industry	Other private	All ownerships	Sampling error of total
	Thousand acres					Percent
Sawtimber stands	266.0	1,852.9	572.0	4,934.6	7,625.5	3
Poletimber stands	194.0	900.8	268.7	3,644.6	5,008.1	4
Sapling-seedling stands	24.0	232.2	123.4	2,704.1	3,083.7	6
Nonstocked areas	1.0	W	W	205.4	206.4	23
Total	485.0	2,985.9	964.1	11,488.7	15,923.7	0.6
Sampling error of total (percent)	(a)	(b)	20	3	0.6	

[a] The National Forest acreage is known without error.

[b] The other public acreage is primarily comprised of State Forest land which is known without error.

W-Less than 50 acres.

Table 4.--Area of commercial forest land, by geographic unit and stand-size class, Pennsylvania, 1978.

(In thousands of acres)

Geographic unit	Sawtimber stands	Poletimber stands	Sapling-seedling stands	Nonstocked areas	All classes
Western	1,041.0	647.3	758.4	87.6	2,534.3
Southwestern	753.9	493.9	326.8	22.5	1,597.1
Allegheny	1,785.1	1,214.2	233.1	49.8	3,282.2
North-Central	1,533.8	811.0	490.8	24.2	2,859.8
South-Central	812.8	504.9	308.5	15.8	1,642.0
Northeastern	471.2	550.8	335.3	--	1,357.3
Pocono	537.2	648.4	471.1	--	1,656.7
Southeastern	690.5	137.6	159.7	6.5	994.3
Total	7,625.5	5,008.1	3,083.7	206.4	15,923.7

Table 5.--Area of commercial forest land, by ownership class and geographic unit, Pennsylvania, 1978.

(In thousands of acres)

Ownership class	Western	South-western	Allegheny	North-Central	South-Central	North-eastern	Pocono	South-eastern	Total
National Forest	--	--	485.0	--	--	--	--	--	485.0
Other federal	3.1	1.0	0.1	0.9	11.6	--	0.8	--	17.5
State	94.4	220.3	863.8	749.4	412.7	110.4	230.8	113.9	2,795.7
County and Municipal	11.3	46.5	15.2	21.6	20.5	8.9	27.5	21.2	172.7
Total public	108.8	267.8	1,364.1	771.9	444.8	119.3	259.1	135.1	3,470.9
Forest industry[a]	25.6	85.6	568.5	161.8	44.6	36.4	20.7	20.9	964.1
Farmer[b]	893.2	352.0	233.3	403.3	378.1	630.6	301.6	320.6	3,512.7
Miscellaneous private:									
Individual	1,160.1	646.7	596.4	951.2	579.6	406.3	489.1	360.9	5,190.3
Corporate	154.9	130.8	320.4	233.0	47.9	91.9	399.7	68.1	1,446.7
Other	191.7	114.2	199.5	338.6	147.0	72.8	186.5	88.7	1,339.0
Total private	2,425.5	1,329.3	1,918.1	2,087.9	1,197.2	1,238.0	1,397.6	859.2	12,452.8
Total, all ownerships	2,534.3	1,597.1	3,282.2	2,859.8	1,642.0	1,357.3	1,656.7	994.3	15,923.7
Sampling error of total (in percent)	2.3	1.8	1.0	1.0	1.0	2.1	1.0	2.0	0.6

[a] Includes unincorporated forest industry.

[b] Includes lands owned by part-time farmers and corporations engaged in agriculture.

Table 6.--Area of commercial forest land, by potential site productivity and ownership class, Pennsylvania, 1978.

Potential site productivity class[a]	National Forest	Other public	Forest industry	Other private	All ownerships	Sampling error of total
	Thousand acres					Percent
120 - 165	W	47.8	29.3	725.4	802.5	12
85 - 119	18.0	437.7	215.1	3,012.9	3,683.7	5
50 - 84	425.0	1,606.5	602.7	4,720.1	7,354.3	3
20 - 49	42.0	893.9	117.0	3,030.3	4,083.2	5
Total	485.0	2,985.9	964.1	11,488.7	15,923.7	

[a] Potential growth in cubic feet per acre per year.

W - Less than 50 acres.

Table 7.--Area of commercial forest land, by geographic unit and potential site productivity class, Pennsylvania, 1978.

(In thousands of acres)

Geographic unit	Potential site productivity class[a]				All classes
	120-165	85-119	50-84	20-49	
Western	246.6	915.5	1,055.5	316.7	2,534.3
Southwestern	85.6	428.9	722.8	359.8	1,597.1
Allegheny	90.7	671.3	1,924.0	596.2	3,282.2
North-Central	161.5	584.0	1,293.6	820.7	2,859.8
South-Central	75.4	331.7	748.9	486.0	1,642.0
Northeastern	86.6	347.7	523.4	399.6	1,357.3
Pocono	33.7	152.2	561.5	909.3	1,656.7
Southeastern	22.4	252.4	524.6	194.9	994.3
Total	802.5	3,683.7	7,354.3	4,083.2	15,923.7

[a] Potential growth in cubic feet per acre per year.

Table 8.--Area of commercial forest land, by forest-type group and ownership class, Pennsylvania, 1978.

(In thousands of acres)

Forest-type group	National Forest	Other public	Forest industry	Other private	All ownerships
White pine and hemlock	14.9	80.1	31.3	459.9	586.2
Spruce/fir	--	--	10.1	68.6	78.7
Scotch and Virginia pine	--	16.0	17.1	164.6	197.7
Oak/pine	--	31.7	--	101.5	133.2
Oak/hickory	105.4	1,753.3	366.2	5,285.2	7,510.1
Oak/gum	--	--	--	9.9	9.9
Elm/ash/red maple	--	11.9	--	587.7	599.6
Northern hardwoods	339.8	1,011.7	528.9	4,430.9	6,311.3
Aspen/birch	24.9	81.2	10.5	380.4	497.0
Total	485.0	2,985.9	964.1	11,488.7	15,923.7

Table 9.--Area of commercial forest land, by forest-type group and stand-size class, Pennsylvania, 1978.

(In thousands of acres)

Forest-type group	Saw-timber stands	Pole-timber stands	Sapling-seedling stands	Non-stocked areas	All stands
White pine and hemlock	370.6	143.9	71.7	--	586.2
Spruce/fir	15.1	28.2	35.4	--	78.7
Scotch and Virginia pine	49.1	45.5	103.1	--	197.7
Oak/pine	53.6	72.1	7.5	--	133.2
Oak/hickory	3,997.8	2,279.4	1,158.3	74.6	7,510.1
Oak/gum	--	9.9	--	--	9.9
Elm/ash/red maple	187.5	168.7	201.9	41.5	599.6
Northern hardwoods	2,923.2	2,093.2	1,225.3	69.6	6,311.3
Aspen/birch	28.6	167.2	280.5	20.7	497.0
Total	7,625.5	5,008.1	3,083.7	206.4	15,923.7

Table 10.--Area of commercial forest land, by forest-type group and geographic unit, Pennsylvania, 1978.

(In thousands of acres)

Forest-type group	Western	South-western	Allegheny	North-Central	South-Central	North-eastern	Pocono	South-eastern	Total
White pine and hemlock	32.7	26.6	90.6	235.9	31.1	106.3	61.7	1.3	586.2
Spruce/fir	43.7	--	--	9.6	15.1	--	--	10.3	78.7
Scotch and Virginia pine	48.0	10.9	11.0	21.8	67.6	--	21.0	17.4	197.7
Oak/pine	18.9	.6	.5	20.8	41.3	--	35.6	15.5	133.2
Oak/hickory	964.2	932.1	689.6	1,555.4	1,227.5	293.8	1,142.4	705.1	7,510.1
Oak/gum	9.9	--	--	--	--	--	--	--	9.9
Elm/ash/red maple	179.6	69.4	35.8	65.3	58.7	40.3	70.0	80.5	599.6
Northern hardwoods	1,126.7	557.5	2,253.3	858.1	200.4	865.8	285.3	164.2	6,311.3
Aspen/birch	110.6	--	201.4	92.9	.3	51.1	40.7	--	497.0
Total	2,534.3	1,597.1	3,282.2	2,859.8	1,642.0	1,357.3	1,656.7	994.3	15,923.7

Table 11--Area of commercial forest land, by forest type and forest-type group, Pennsylvania, 1978.

Forest type and forest-type group	Area	Sampling error
	Thousand acres	Percent
Red pine	67.5	36
White pine	224.2	21
White pine/hemlock	130.4	28
Hemlock	164.1	26
Total white pine and hemlock group	586.2	13
Red spruce/balsam fir	11.8	100
Tamarack	10.3	99
White spruce	9.6	100
Norway spruce	47.0	58
Total spruce/fir group	78.7	42
Scotch pine	90.6	35
Virginia pine	62.9	45
Eastern redcedar	6.4	103
Pitch pine	37.8	56
Total Scotch and Virginia pine group	197.7	24
Scotch pine/oak	6.6	76
Virginia pine/oak	76.5	35
Other oak/pine	50.1	44
Total oak/pine group	133.2	26
Post, black, or bear oak	771.9	11
Chestnut oak	1,816.6	7
White oak/red oak/hickory	856.1	10
White oak	573.6	13
Northern red oak	943.1	10
Yellow-poplar/white oak/ northern red oak	640.8	12
Red maple/central hardwoods	869.4	10
Black walnut	97.9	37
Central mixed hardwoods	940.7	10
Total oak/hickory group	7,510.1	3
Swamp chestnut oak/cherrybark oak	9.9	100
Total oak/gum group	9.9	100
Black ash/American elm/red maple	523.5	15
River birch/sycamore	49.8	45
Willow	26.3	70
Total elm/ash/red maple group	599.6	14
Sugar maple/beech/yellow birch	2,412.9	5
Black cherry	1,393.8	8
Red maple/northern hardwoods	1,324.1	8
Northern mixed hardwoods	1,180.5	9
Total northern hardwoods group	6,311.3	3
Aspen	457.1	17
Gray/paper birch	39.9	49
Total aspen/birch group	497.0	16
Total all groups	15,923.7	0.6

Table 12.--Number of live trees on commercial forest land, by tree and diameter class, softwoods and hardwoods, Pennsylvania, 1978.

Diameter class (inches at breast height)	Softwoods					Hardwoods				
	Growing-stock	Sampling error	Rough and rotten	Sampling error	Total	Growing-stock	Sampling error	Rough and rotten	Sampling error	Total
	Thousand trees	Percent	Thousand trees	Percent	Thousand trees	Thousand trees	Percent	Thousand trees	Percent	Thousand trees
5.0 - 6.9	92,947	10	9,986	20	102,933	683,654	3	176,493	5	860,147
7.0 - 8.9	49,132	9	4,002	20	53,134	488,244	2	69,587	5	557,831
9.0 - 10.9	--		--		--	317,763	2	29,479	7	347,242
Total poletimber	142,079	8	13,988	17	156,067	1,489,661	2	275,559	3	1,765,220
9.0 - 10.9	29,056	11	4,816	18	33,872	--		--		--
11.0 - 12.9	17,861	9	2,335	17	20,196	180,305	3	20,325	6	200,630
13.0 - 14.9	7,472	11	1,183	20	8,655	100,537	3	8,955	7	109,492
Total small sawtimber	54,389	7	8,334	12	62,723	280,842	2	29,280	5	310,122
15.0 - 16.9	4,873	12	849	31	5,722	52,889	4	4,765	10	57,654
17.0 - 18.9	2,506	13	332	28	2,838	29,940	4	3,515	10	33,455
19.0 - 20.9	1,285	16	233	31	1,518	14,022	5	2,215	11	16,237
21.0 - 28.9	1,456	14	266	27	1,722	14,141	7	2,517	9	16,658
29.0 - and larger	88	41	25	80	113	1,300	13	628	3	1,928
Total large sawtimber	10,208	7	1,705	17	11,913	112,292	2	13,640	5	125,932
Total, all classes	206,676	5	24,027	10	230,703	1,882,795	1	318,479	4	2,201,274

Table 13 .--Number of growing-stock trees on commercial forest land, by species and diameter class, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	23,345	13,960	9,686	4,758	1,880	1,473	1,136	457	804	73	57,572
Virginia pine	6,478	3,882	2,603	776	139	72	--	19	--	--	13,969
Other yellow pines	15,282	5,613	4,317	2,065	598	378	49	--	--	--	28,302
Hemlock	42,712	23,578	11,627	9,948	4,783	2,950	1,297	809	636	15	98,355
Other softwoods	5,130	2,099	823	314	72	--	24	--	16	--	8,478
Total softwoods	92,947	49,132	29,056	17,861	7,472	4,873	2,506	1,285	1,456	88	206,676
Select white oaks[a]	40,584	31,488	22,831	12,739	6,997	3,917	2,548	1,201	1,190	189	123,684
Northern red oak	42,207	36,085	31,588	23,381	13,912	9,299	5,694	3,499	3,423	368	169,456
Other oaks[b]	21,212	20,243	17,296	12,800	8,969	4,006	3,278	1,239	1,754	100	90,897
Chestnut oak	73,286	65,107	40,775	22,069	12,194	6,051	3,086	1,054	971	19	224,612
Hickory	13,157	13,555	9,379	5,671	2,963	1,419	765	200	383	22	47,514
Yellow birch	12,468	7,939	3,669	1,388	560	141	123	2	71	--	26,361
Sweet birch	53,416	30,213	14,154	4,939	2,293	1,338	426	190	168	--	107,137
Sugar maple	70,729	53,600	28,375	16,171	9,377	4,203	2,073	974	792	144	186,438
Red maples[c]	177,846	100,952	58,137	29,791	13,822	4,821	3,043	1,115	1,083	128	390,738
Beech	30,670	18,382	12,643	7,513	4,685	2,469	1,586	848	694	73	79,563
Blackgum	9,380	2,907	1,639	805	245	336	124	46	120	--	15,602
White ash	26,435	16,425	12,364	8,210	4,538	2,901	1,643	719	365	73	73,673
Aspen	27,621	19,233	12,000	4,041	1,511	423	52	18	--	--	64,899
Basswood	7,978	7,068	4,846	2,553	1,383	835	292	270	142	11	25,378
Yellow-poplar	7,309	5,178	5,312	4,544	3,458	2,540	1,288	789	1,202	93	31,713
Black walnut	3,888	1,715	1,121	553	441	529	54	74	84	--	8,459
Black cherry	44,602	39,817	30,528	18,333	10,034	5,691	3,178	1,382	1,130	47	154,742
Black locust	7,270	8,659	3,906	1,301	625	512	213	79	99	--	22,664
Other hardwoods	13,596	9,678	7,200	3,503	2,530	1,458	474	323	470	33	39,265
Total hardwoods	683,654	488,244	317,763	180,305	100,537	52,889	29,940	14,022	14,141	1,300	1,882,795
Total, All species	776,601	537,376	346,819	198,166	108,009	57,762	32,446	15,307	15,597	1,388	2,089,471

[a] Includes white, swamp white, and bur oaks.
[b] Includes scarlet, southern red, shingle, pin, willow, post and black oaks.
[c] Includes 1,547,000 silver maple trees.

Table 14.--Net volume of timber on commercial forest land, by class of timber, softwoods and hardwoods, Pennsylvania, 1978.

Class of timber	Softwoods	Hardwoods	All species	Sampling error of total
	---------	Million cubic feet	---------	Percent
Sawtimber trees:				
Sawlog portion	1,013.4	8,673.0	9,686.4	2
Upper-stem portion	130.7	2,073.8	2,204.5	1
All sawtimber trees	1,144.1	10,746.8	11,890.9	1
Poletimber trees	622.9	9,242.3	9,865.2	2
All growing-stock trees	1,767.0	19,989.1	21,756.1	1
Rough trees	174.7	1,197.6	1,372.3	4
Rotten trees	19.2	439.3	458.5	4
Total, all timber	1,960.9	21,626.0	23,586.9	0.8

Table 15.--Net volume of timber on commercial forest land, by geographic unit and class of timber, Pennsylvania, 1978.

Geographic unit	Growing-stock trees			Rough trees	Rotten trees	All trees	Sampling error[a]
	Poletimber	Sawtimber	Total				
	Million cubic feet						Percent
Western	914.0	1,283.8	2,197.8	235.7	43.4	2,476.9	2.7
Southwestern	886.6	1,040.0	1,926.6	165.4	42.5	2,134.5	2.8
Allegheny	2,970.4	3,284.0	6,254.4	334.7	139.1	6,728.2	1.3
North-Central	1,671.1	2,052.3	3,723.4	170.6	71.2	3,965.2	1.8
South-Central	916.9	1,459.7	2,376.6	110.9	41.7	2,529.2	1.9
Northeastern	980.3	851.3	1,831.6	154.8	60.3	2,046.7	2.5
Pocono	1,027.4	774.4	1,801.8	113.6	41.2	1,956.6	2.5
Southeastern	498.5	1,145.4	1,643.9	86.6	19.1	1,749.6	3.5
Total	9,865.2	11,890.9	21,756.1	1,372.3	458.5	23,586.9	0.8

[a] For volume of all trees.

Table 16.--Net volume of growing stock and sawtimber on commercial forest land, by geographic unit and stand-size class, Pennsylvania, 1978.

Geographic unit	Sawtimber stands	Poletimber stands	Sapling-seedling stands	Nonstocked areas	All classes
			GROWING STOCK		
	----------	----------	Million cubic feet	----------	----------
Western	1,412.4	593.8	191.6	--	2,197.8
Southwestern	1,221.7	604.2	100.7	--	1,926.6
Allegheny	3,960.5	2,247.0	46.9	--	6,254.4
North-Central	2,627.3	941.4	152.6	2.1	3,723.4
South-Central	1,630.7	640.3	105.6	--	2,376.6
Northeastern	915.6	831.8	84.2	--	1,831.6
Pocono	801.5	840.0	160.3	--	1,801.8
Southeastern	1,396.8	189.5	57.6	--	1,643.9
Total	13,966.5	6,888.0	899.5	2.1	21,756.1
Sampling error of total (percent)	2	4	9	102	0.8
			SAWTIMBER		
	----------	----------	Million board feet[a]	----------	----------
Western	4,502.1	871.9	377.2	--	5,751.2
Southwestern	3,911.9	676.5	185.7	--	4,774.1
Allegheny	10,341.2	2,618.4	70.9	--	13,030.5
North-Central	7,024.6	1,104.2	142.5	--	8,271.3
South-Central	3,971.1	769.8	127.1	--	4,868.0
Northeastern	2,281.3	790.9	95.5	--	3,167.7
Pocono	1,724.1	843.3	131.8	--	2,699.2
Southeastern	3,534.2	234.0	95.6	--	3,863.8
Total	37,290.5	7,909.0	1,226.3	--	46,425.8
Sampling error of total (percent)	2	6	13	--	1.1

[a] International 1/4-inch rule.

Table 17.--Net volume of growing stock and sawtimber on commercial forest land, by geographic unit and ownership class, Pennsylvania, 1978.

Geograpghic unit	National Forest	Other public	Forest industry	Other private	Total	Sampling error of total
			GROWING STOCK			
	----------	----------	Million cubic feet	----------	----------	Percent
Western	--	97.4	37.3	2,063.1	2,197.8	2.9
Southwestern	--	471.2	89.7	1,365.7	1,926.6	3.0
Allegheny	1,326.0	1,796.7	924.0	2,207.7	6,254.4	1.3
North-Central	--	1,082.1	219.4	2,421.9	3,723.4	1.9
South-Central	--	797.5	83.5	1,495.6	2,376.6	1.9
Northeastern	--	212.8	36.3	1,582.5	1,831.6	2.6
Pocono	--	304.3	32.3	1,465.2	1,801.8	2.6
Southeastern	--	186.2	33.5	1,424.2	1,643.9	3.4
Total	1,326.0	4,948.2	1,456.0	14,025.9	21,756.1	0.8
Sampling error of total (percent)	4	4	10	2	0.8	
			SAWTIMBER			
	----------	----------	Million board feet[a]	----------	----------	
Western	--	233.9	67.3	5,450.0	5,751.2	3.6
Southwestern	--	1,227.0	265.0	3,282.1	4,774.1	4.2
Allegheny	2,338.9	3,916.9	2,003.9	4,770.8	13,030.5	2.1
North-Central	--	2,444.0	529.2	5,298.1	8,271.3	2.6
South-Central	--	1,765.5	210.5	2,892.0	4,868.0	2.7
Northeastern	--	322.7	41.1	2,803.9	3,167.7	3.4
Pocono	--	452.7	43.6	2,202.9	2,699.2	4.5
Southeastern	--	422.8	47.0	3,394.0	3,863.8	4.2
Total	2,338.9	10,785.5	3,207.6	30,093.8	46,425.8	1.1
Sampling error of total (percent)	7	5	12	3	1.1	

[a] International 1/4-inch rule.

Table 18.--Net volume of growing stock and sawtimber on commercial forest land, by forest-type group, softwoods, and hardwoods, Pennsylvania, 1978.

Forest-type group	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species
	------- Million cubic feet ---------			-------- Million board feet[a] ---------		
White pine and hemlock	573.3	353.6	926.9	1,366.6	634.9	2,001.5
Spruce/fir	26.1	16.3	42.4	48.0	14.9	62.9
Shortleaf and Virginia pine	111.4	22.2	133.6	157.3	23.8	181.1
Oak/pine	45.7	72.3	118.0	104.6	103.0	207.6
Oak/hickory	343.7	10,028.9	10,372.6	937.7	21,815.0	22,752.7
Oak/gum	--	11.5	11.5	--	16.9	16.9
Elm/ash/red maple	25.4	476.2	501.6	69.4	1,083.3	1,152.7
Northern hardwoods	628.3	8,777.3	9,405.6	1,635.6	18,191.1	19,826.7
Aspen/birch	13.1	230.8	243.9	9.7	214.0	223.7
Total	1,767.0	19,989.1	21,756.1	4,328.9	42,096.9	46,425.8

[a] International 1/4-inch rule.

Table 19 .--Net volume of growing stock and sawtimber on commercial forest land, by forest-type group and geographic unit, Pennsylvania, 1978.

Forest-type group	Western	South-western	Allegheny	North-Central	South-Central	North-eastern	Pocono	South-eastern	All units
					GROWING STOCK				
					Million cubic feet				
White pine and hemlock	80.8	24.1	151.1	292.4	58.8	228.3	91.1	0.3	926.9
Spruce/fir	12.2	--	--	1.0	23.5	--	--	5.7	42.4
Scotch and Virginia pine	33.3	0.4	0.7	11.4	44.8	--	23.1	19.9	133.6
Oak/pine	25.8	W	--	12.5	30.0	--	47.7	2.0	118.0
Oak/hickory	870.6	1,193.3	1,381.6	2,088.6	1,923.1	342.4	1,205.8	1,367.2	10,372.6
Oak/gum	11.5	--	--	--	--	--	--	--	11.5
Elm/ash/red maple	108.9	64.3	37.5	70.0	41.5	29.2	66.6	83.6	501.6
Northern hardwoods	1,011.6	644.5	4,549.5	1,200.3	254.8	1,213.9	365.8	165.2	9,405.6
Aspen/birch	43.1	W	134.0	47.2	0.1	17.8	1.7	W	243.9
Total	2,197.8	1,926.6	6,254.4	3,723.4	2,376.6	1,831.6	1,801.8	1,643.9	21,756.1
					SAWTIMBER				
					Million board feet[a]				
White pine and hemlock	162.0	39.4	261.5	736.0	85.8	541.0	175.0	0.8	2,001.5
Spruce/fir	27.9	--	--	--	33.1	--	--	1.9	62.9
Scotch and Virginia pine	32.3	0.1	--	6.5	68.7	--	29.4	44.1	181.1
Oak/pine	58.5	0.1	--	22.0	44.1	--	77.0	5.9	207.6
Oak/hickory	2,453.0	2,856.6	3,147.1	4,725.9	4,028.6	532.7	1,806.2	3,202.6	22,752.7
Oak/gum	16.9	--	--	--	--	--	--	--	16.9
Elm/ash/red maple	355.2	174.9	77.3	139.8	64.8	74.8	63.7	202.2	1,152.7
Northern hardwoods	2,618.8	1,703.0	9,416.2	2,583.3	542.8	2,008.4	547.9	406.3	19,826.7
Aspen/birch	26.6	W	128.4	57.8	0.1	10.8	W	W	223.7
Total	5,751.2	4,774.1	13,030.5	8,271.3	4,868.0	3,167.7	2,699.2	3,863.8	46,425.8

[a] International 1/4-inch rule.

[W] Less than 50,000 cubic or board feet.

Table 20.--Net volume of growing stock on commercial forest land, by species and diameter class, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	120.7	109.4	108.9	76.8	45.0	44.2	48.2	24.2	55.1	8.5	641.0
Virginia pine	10.4	19.4	24.6	11.8	2.9	1.8	--	0.7	--	--	71.6
Other yellow pines	26.6	23.9	38.4	30.7	14.3	14.5	1.9	--	--	--	150.3
Hemlock	157.1	136.6	108.8	142.4	101.0	85.0	50.9	41.1	46.5	2.3	871.7
Other softwoods	9.3	9.5	7.1	3.8	1.1	--	0.8	--	0.8	--	32.4
Total softwoods	324.1	298.8	287.8	265.5	164.3	145.5	101.8	66.0	102.4	10.8	1,767.0
Select white oaks[a]	121.7	193.0	245.2	220.5	179.0	133.3	114.8	70.1	84.6	20.1	1,382.3
Northern red oak	148.2	236.4	362.8	424.7	358.7	319.0	253.4	192.1	259.6	42.8	2,597.7
Other oaks[b]	76.7	129.8	188.1	218.1	216.5	131.8	148.1	67.6	115.9	10.5	1,303.1
Chestnut oak	234.8	385.3	408.9	343.1	276.4	177.4	120.0	51.7	58.5	2.3	2,058.4
Hickory	48.4	92.2	107.3	103.6	77.1	52.1	33.5	10.6	30.5	1.0	556.3
Yellow birch	44.2	51.5	38.0	22.0	12.8	4.1	4.0	0.1	4.3	--	181.0
Sweet birch	186.6	198.0	146.2	75.9	46.7	39.3	15.7	8.4	11.3	--	728.1
Sugar maple	304.8	415.7	355.7	307.4	245.5	143.7	90.6	51.8	56.5	19.2	1,990.9
Red maples[c]	636.1	718.3	689.0	539.4	354.5	165.2	129.1	56.1	65.1	16.7	3,369.5
Beech	120.5	136.8	144.3	135.8	119.5	82.3	68.0	44.9	43.1	5.6	900.8
Blackgum	33.2	19.2	16.0	12.3	7.1	11.0	6.3	2.6	9.2	--	116.9
White ash	86.7	112.1	144.8	152.2	122.2	101.8	75.7	45.4	28.0	10.6	879.5
Aspen	85.8	122.8	138.9	76.1	38.2	15.3	2.5	0.9	--	--	480.5
Basswood	32.0	55.2	69.0	61.0	45.7	36.4	15.3	17.2	9.4	1.0	342.2
Yellow-poplar	26.6	31.7	60.5	78.6	86.7	87.1	56.0	43.0	76.8	11.9	558.9
Black walnut	8.1	7.0	9.6	7.9	10.4	15.4	2.3	3.5	3.3	--	67.5
Black cherry	152.7	248.4	347.1	333.4	266.2	207.9	149.4	82.2	99.5	5.5	1,892.3
Black locust	17.7	47.2	40.4	20.3	17.1	18.1	8.8	3.7	5.9	--	179.2
Other hardwoods	40.2	52.2	72.7	56.3	63.5	45.8	18.8	18.1	30.4	6.0	404.0
Total hardwoods	2,405.0	3,252.8	3,584.5	3,188.6	2,543.8	1,787.0	1,312.3	770.0	991.9	153.2	19,989.1
Total, all species	2,729.1	3,551.6	3,872.3	3,454.1	2,708.1	1,932.5	1,414.1	836.0	1,094.3	164.0	21,756.1

[a] Includes white, swamp white and bur oaks.

[b] Includes scarlet, southern red, shingle, pin, willow, post, and black oaks.

[c] Includes 25.8 million cubic feet of silver maple.

Table 21.--Net volume of sawtimber on commercial forest land, by species and diameter class, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	349.2	277.7	177.9	185.8	211.9	105.6	255.5	40.3	1,603.9
Virginia pine	66.9	40.6	10.6	8.0	--	3.5	--	--	129.6
Other yellow pines	117.7	109.9	59.4	65.5	7.7	--	--	--	360.2
Hemlock	335.9	503.3	393.0	347.6	218.3	166.0	212.5	10.5	2,187.1
Other softwoods	20.7	15.4	5.4	--	3.3	--	3.3	--	48.1
Total softwoods	890.4	946.9	646.3	606.9	441.2	275.1	471.3	50.8	4,328.9
Select white oaks[b]	--	764.5	650.2	528.2	474.3	294.5	388.1	115.2	3,215.0
Northern red oak	--	1,560.6	1,432.4	1,332.1	1,070.7	858.1	1,212.9	201.8	7,668.6
Other oaks[c]	--	778.6	837.0	507.2	605.5	281.9	507.0	55.6	3,572.8
Chestnut oak	--	1,167.8	982.8	716.7	467.9	219.2	239.3	11.2	3,804.9
Hickory	--	351.5	286.2	203.0	141.6	41.3	124.5	9.3	1,157.4
Yellow birch	--	72.5	44.0	16.6	17.6	0.5	12.4	--	163.6
Sweet birch	--	253.5	175.7	155.2	48.3	30.4	47.3	--	710.4
Sugar maple	--	1,082.7	985.3	618.3	380.5	240.7	275.3	92.3	3,675.1
Red maples[d]	--	1,800.0	1,326.5	676.2	551.9	258.6	316.4	74.2	5,003.8
Beech	--	455.7	458.2	340.1	279.6	186.0	205.0	32.8	1,957.4
Blackgum	--	41.1	28.0	43.5	26.1	8.8	36.9	--	184.4
White ash	--	508.4	449.6	407.4	335.7	196.3	120.0	49.6	2,067.0
Aspen	--	273.8	158.0	64.8	11.5	4.9	--	--	513.0
Basswood	--	219.0	189.8	155.3	60.4	74.5	41.0	3.3	743.3
Yellow-poplar	--	258.7	330.5	325.3	227.9	195.7	343.2	44.6	1,725.9
Black walnut	--	27.8	36.4	74.2	8.2	17.4	21.9	--	185.9
Black cherry	--	1,147.5	1,028.1	858.6	632.9	364.6	438.9	29.8	4,500.4
Black locust	--	70.4	59.9	68.1	37.1	14.8	30.5	--	280.8
Other hardwoods	--	190.2	242.1	196.4	86.5	80.0	145.0	27.0	967.2
Total hardwoods	--	11,024.3	9,700.7	7,287.2	5,464.2	3,368.2	4,505.6	746.7	42,096.9
Total, all species	890.4	11,971.2	10,347.0	7,894.1	5,905.4	3,643.3	4,976.9	797.5	46,425.8

[a] International 1/4-inch rule.

[b] Includes white, swamp white, and bur oaks.

[c] Includes scarlet, shingle, pin, willow, and black oaks.

[d] Includes 78.1 million board feet of silver maple.

Table 22 .--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Pennsylvania, 1978.
(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	58.3	209.0	787.1	549.5	1,603.9
Yellow pines	26.6	66.6	396.6	--	489.8
Other softwoods[c]	--	--	--	--	2,235.2
Total softwoods	84.9	275.6	1,183.7	549.5	4,328.9
Select white oaks[d]	518.7	646.0	1,391.8	658.5	3,215.0
Northern red oak	2,032.8	1,851.1	2,981.5	803.2	7,668.6
Other oaks[e]	530.6	699.2	1,447.8	895.2	3,572.8
Chestnut oak	382.7	909.3	1,894.1	618.8	3,804.9
Hickory	92.5	215.9	572.8	276.2	1,157.4
Yellow birch	5.9	32.3	101.3	24.1	163.6
Sweet birch	57.6	158.5	396.7	97.6	710.4
Sugar maple	533.2	813.8	1,778.4	549.7	3,675.1
Red maples[f]	280.7	849.3	3,066.7	807.1	5,003.8
Beech	142.8	319.2	1,002.0	493.4	1,957.4
Blackgum	23.9	41.0	92.3	27.2	184.4
White ash	453.8	526.6	845.4	241.2	2,067.0
Aspen	14.2	74.8	305.8	118.2	513.0
Basswood	91.9	149.9	428.0	73.5	743.3
Yellow-poplar	410.9	390.4	633.1	291.5	1,725.9
Black walnut	32.2	27.4	106.0	20.3	185.9
Black cherry	660.1	1,060.6	2,270.1	509.6	4,500.4
Black locust	7.4	41.2	197.5	34.7	280.8
Other hardwoods	155.5	209.2	479.3	123.2	967.2
Total hardwoods	6,427.4	9,015.7	19,990.6	6,663.2	42,096.9
Hardwood quality (in percent)	15	21	48	16	100
Hardwood Sampling error (in percent)	3	2	2	2	13

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes white, swamp white, and bur oaks.

[e] Includes scarlet, shingle, pin, willow, and black oaks.

[f] Includes 78.1 million board feet of silver maple.

Table 23.--Sampling errors for major number of trees and timber-volume classes, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 13)	Growing-stock volume (Table 20)	Sawtimber volume (Table 21)
White and red pines	14	12	12
Virginia pine	26	30	32
Other yellow pines	19	15	17
Hemlock	10	8	9
Other softwoods	37	34	48
Select white oaks	6	5	6
Northern red oak	5	4	5
Other oaks	6	6	6
Chestnut oak	5	5	6
Hickory	9	9	11
Yellow birch	12	11	17
Sweet birch	8	7	11
Sugar maple	6	6	7
Red maples	4	4	6
Beech	8	7	9
Blackgum	13	12	19
White ash	8	7	8
Aspen	10	9	14
Basswood	15	13	14
Yellow-poplar	12	11	12
Black walnut	31	22	30
Black cherry	7	6	7
Black locust	18	17	23
Other hardwoods	11	10	12
Dbh classes (inches)			
5.0 to 6.9	3	3	--
7.0 to 8.9	2	2	--
9.0 to 10.9	2	2	11
11.0 to 12.9	2	2	2
13.0 to 14.9	3	2	2
15.0 to 16.9	3	3	3
17.0 to 18.9	4	4	3
19.0 to 20.9	5	5	4
21.0 to 28.9	6	5	4
29.0 +	13	13	12

Table 24.--Components of average annual net change of growing stock and sawtimber on commercial forest land, by softwoods and hardwoods, Pennsylvania, 1964-1977.

Component	Softwoods	Hardwoods	All species
	GROWING STOCK		
	--------- Million cubic feet -----------		
Accretion[a]	19	501	520
Ingrowth[b]	40	140	180
Gross growth	59	641	700
Cull increment	-1	-39	-40
Mortality	-4	-101	-105
Net growth	54	501	555
Removals	-28	-227	-255
Inventory change	26	274	300
	SAWTIMBER		
	--------- Million board feet[c] -----------		
Accretion[d]	86	903	989
Ingrowth[e]	60	1,066	1,126
Gross growth	146	1,969	2,115
Cull increment	-4	-61	-65
Mortality	-11	-160	-171
Net growth	131	1,748	1,879
Removals[f]	-45	-670	-715
Inventory change	86	1,078	1,164

[a] Growth on initial growing-stock inventory, including trees that were subsequently cut.

[b] Volume of trees that became 5.0-inches dbh or larger during the period between inventories.

[c] International 1/4-inch rule.

[d] Growth on initial sawtimber inventory, including trees that were subsequently cut.

[e] Volume of trees that became sawtimber size during the period between inventories.

[f] During the past decade that portion of removals due to land reclassification has been exceptionally high. In order to avoid overestimation of removals on the current forest land base, a portion of the removals due to land reclassification has been excluded from this figure.

Table 25.--Annual net growth, removals, and mortality of growing stock and sawtimber on commercial forest land, by species, Pennsylvania, 1977.

Species	Growing stock			Sawtimber		
	Net growth	Timber removals[a]	Mortality	Net growth	Timber removals[a]	Mortality
	------- Million cubic feet --------			------- Million board feet[b] --------		
Hemlock	32	18	3	126	68	11
Other softwoods	28	13	2	59	19	8
Total softwoods	60	31	5	185	87	19
Select white oaks	26	32	11	171	130	21
Northern red oaks	66	45	15	330	139	50
Chestnut oak	34	22	15	181	80	21
Other oaks	39	31	11	153	87	25
Red maples	82	17	5	248	36	8
Sugar maple	92	21	8	271	56	4
Black cherry	60	22	5	197	60	2
Other hardwoods	148	58	35	457	130	47
Total hardwoods	547	248	105	2,008	718	178
Total, all species	607	279	110	2,193	805	197

[a] Data for timber removals in this table are based on the trend from 1964 through 1977 and differ from those shown in Table 29. Table 29 reports the results of a canvass of timber removals for 1976. During the past decade that portion of removals due to land reclassification has been exceptionally high. In order to avoid overestimation of removals on the current forest land base, a portion of the removals due to land reclassification has been excluded from this figure.

[b] International 1/4-inch rule.

Table 26.--Annual net growth and removals of growing stock and sawtimber on commercial forest land, by ownership class, Pennsylvania, 1977.

Ownership	Net growth	Timber removals[a]
	GROWING STOCK	
	Million cubic feet	
Public	236	55
Forest industry	33	21
Other private	338	203
Total	607	279
	SAWTIMBER	
	Million board feet[b]	
Public	695	147
Forest industry	189	102
Other private	1,309	556
Total	2,193	805

[a] Data for timber removals in this table are based on the trend from 1964 through 1977 and differ from those shown in Table 29. Table 29 reports the results of a canvass of timber removals for 1976. During the past decade that portion of removals due to land reclassification has been exceptionally high. In order to avoid overestimation of removals on the current forest land base, a portion of the removals due to land reclassification has been excluded from this figure.

[b] International 1/4-inch rule.

Table 27.--Output of timber products, by source of material, softwoods, and hardwoods, Pennsylvania, 1976[a].

Product and species group	Standard units	Output from roundwood		Output from Manufacturing residues		Total output	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs							
Softwood	Mbf[b]	52,846	8,715	--	--	52,846	8,715
Hardwood	Mbf	591,312	94,988	--	--	591,312	94,988
Total	Mbf	644,158	103,703	--	--	644,158	103,703
Veneer logs and bolts							
Softwood	Mbf	--	--	--	--	--	--
Hardwood	Mbf	14,739	2,073	--	--	14,739	2,073
Total	Mbf	14,739	2,073	--	--	14,739	2,073
Pulpwood							
Softwood	Std cords[c]	35,890	3,051	20,255	1,722	56,145	4,773
Hardwood	Std cords	589,313	50,092	263,987	22,438	853,300	72,530
Total	Std cords	625,203	53,143	284,242	24,160	909,445	77,303
Cooperage logs and bolts							
Softwood	Mbf	--	--	--	--	--	--
Hardwood	Mbf	4,224	538	--	--	4,224	538
Total	Mbf	4,224	538	--	--	4,224	538
Posts (round and split)							
Softwood	M pieces	--	--	--	--	--	--
Hardwood	M pieces	270	231	--	--	270	231
Total	M pieces	270	231	--	--	270	231
Mine timbers (round)							
Softwood	Mft^3	163	163	--	--	163	163
Hardwood	Mft^3	4,398	4,398	--	--	4,398	4,398
Total	Mft^3	4,561	4,561	--	--	4,561	4,561
Other[d]							
Softwood	Mft^3	125	125	170	170	295	295
Hardwood	Mft^3	1,680	1,680	2,390	2,390	4,070	4,070
Total	Mft^3	1,805	1,805	2,560	2,560	4,365	4,365
Total industrial products							
Softwood	Mft^3		12,054		1,892		13,946
Hardwood	Mft^3		154,000		24,828		178,828
Total	Mft^3		166,054		26,720		192,774
Fuelwood							
Softwood	Std cords[e]	--	--	6,525	522	6,525	522
Hardwood	Std cords	130,000	10,400	110,650	8,852	240,650	19,252
Total	Std cords	130,000	10,400	117,175	9,374	247,175	19,774
All products[f]							
Softwood	Mft^3		12,054		2,414		14,468
Hardwood	Mft^3		164,400		33,680		198,080
Total	Mft^3		176,454		36,094		212,548

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[a] Source of data: Bones and Sherwood 1979.

[b] International 1/4-inch rule.

[c] Rough wood basis, includes both production from roundwood and chips from manufacturing residues, equivalent to 85 ft^3 of solid wood.

[d] Includes handle and bat stock, charcoal wood, and wood fiber products.

[e] Rough wood basis, includes both production from roundwood and chips from manufacturing residues, equivalent to 80 ft^3 of solid wood.

[f] Does not include 1,045,000 cubic feet of softwood and 12,694,000 cubic feet of hardwood residues used for livestock bedding and farm and horticultural mulch.

Table 28.--Output of roundwood products, by source, softwoods and hardwoods, Pennsylvania, 1976[a].

(In thousands of cubic feet)

Product and species group	Growing-stock trees[b]			Rough and rotten trees[b]	Salvable dead trees[b]	Other sources[c]	All sources
	Poletimber	Sawtimber	Total				
PRINCIPAL INDUSTRIAL PRODUCTS							
Sowlogs							
Softwood	29	8,577	8,606	6	--	103	8,715
Hardwood	1,543	90,686	92,229	1,262	--	1,497	94,988
Total	1,572	99,263	100,835	1,268	--	1,600	103,703
Veneer logs and bolts							
Softwood	--	--	--	--	--	--	--
Hardwood	34	2,006	2,040	--	--	33	2,073
Total	34	2,006	2,040	--	--	33	2,073
Pulpwood							
Softwood	2,146	312	2,458	14	--	579	3,051
Hardwood	17,275	31,056	48,331	128	118	1,515	50,092
Total	19,421	31,368	50,789	142	118	2,094	53,143
MISCELLANEOUS INDUSTRIAL PRODUCTS							
Cooperage logs and bolts							
Softwood	--	--	--	--	--	--	--
Hardwood	9	520	529	--	--	9	538
Total	9	520	529	--	--	9	538
Posts (round and split)							
Softwood	--	--	--	--	--	--	--
Hardwood	167	56	223	1	--	7	231
Total	167	56	223	1	--	7	231
Mine timbers (round)							
Softwood	115	17	132	1	--	30	163
Hardwood	1,516	2,727	4,243	11	11	133	4,398
Total	1,631	2,744	4,375	12	11	163	4,561
Other							
Softwood	43	78	121	--	--	4	125
Hardwood	579	1,042	1,621	4	4	51	1,680
Total	622	1,120	1,742	4	4	55	1,805
TOTAL INDUSTRIAL PRODUCTS							
Softwood	2,333	8,984	11,317	21	--	716	12,054
Hardwood	21,123	128,093	149,216	1,406	133	3,245	154,000
Total	23,456	137,077	160,533	1,427	133	3,961	166,054
NONINDUSTRIAL PRODUCTS							
Fuelwood							
Softwood	--	--	--	--	--	--	--
Hardwood	3,586	6,449	10,035	26	25	314	10,400
Total	3,586	6,449	10,035	26	25	314	10,400
ALL PRODUCTS							
Softwood	2,333	8,984	11,317	21	--	716	12,054
Hardwood	24,709	134,542	159,251	1,432	158	3,559	164,400
Total	27,042	143,526	170,568	1,453	158	4,275	176,454

[a] Source of data: Bones and Sherwood 1979.

[b] On commercial forest land.

[c] Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or any material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Table 29.--Timber removals from growing stock and sawtimber on commercial forest land, by item, softwoods and hardwoods, Pennsylvania, 1976.[a]

Item	Growing stock			Sawtimber		
	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species
	-----Thousand cubic feet-----			----Thousand board feet[b]-----		
Roundwood products:						
Sawlogs	8,606	92,229	100,835	41,677	420,504	462,181
Veneer logs and bolts	--	2,040	2,040	--	9,296	9,296
Pulpwood	2,458	48,331	50,789	1,095	137,808	138,903
Cooperage logs and bolts	--	529	529	--	2,413	2,413
Piling	--	--	--	--	--	--
Poles	--	--	--	--	--	--
Posts	--	223	223	--	248	248
Mine timbers	132	4,243	4,375	59	12,100	12,159
Other	121	1,621	1,742	363	4,622	4,985
Fuelwood	--	10,035	10,035	--	28,615	28,615
All products	11,317	159,251	170,568	43,194	615,606	658,800
Logging residues	1,148	53,245	54,393	780	19,134	19,914
Land clearing	1,170	14,030	15,200	2,405	26,842	29,247
Land classification	2,135	27,305	29,440	4,625	58,523	63,148
Total removals	15,770	253,831	269,601	51,004	720,105	771,109

[a] Source of data: Bones and Sherwood 1979.
[b] International 1/4-inch rule.

Table 30.--Volume of unused residues from primary manufacturing plants, by industry and type of residue, softwoods and hardwoods, Pennsylvania, 1976.[a]

(In thousands of cubic feet)

Species group and type of residue	Lumber	Veneer and plywood	Other	All industries
Softwoods				
Coarse[b]	532	--	--	532
Fine[c]	373	--	--	373
Total	905	--	--	905
Hardwoods				
Coarse	6,027	--	117	6,144
Fine	4,392	--	96	4,488
Total	10,419	--	213	10,632
All species				
Coarse	6,559	--	117	6,676
Fine	4,765	--	96	4,861
Total	11,324	--	213	11,537

[a] Source of data: Bones and Sherwood 1979.

[b] Includes slabs, edgings, trimmings, veneer cores, and other material suitable for chipping.

[c] Includes sawdust, shavings, and other material considered unsuitable for chipping.

Table 31.--Number of growing-stock trees on commercial forest land, by species and diameter class, Western Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	2,369	1,804	1,579	363	134	27	--	--	13	--	6,289
Other yellow pines	7,527	2,857	1,548	183	--	39	--	--	--	--	12,154
Hemlock	3,099	1,923	852	616	117	105	84	59	14	--	6,869
Other softwoods	837	137	93	264	72	--	--	--	--	--	1,403
Total softwoods	13,832	6,721	4,072	1,426	323	171	84	59	27	--	26,715
Select white oaks[a]	2,100	2,438	2,040	2,085	912	706	343	241	376	171	11,412
Northern red oak	3,889	5,473	3,701	2,650	1,370	1,006	711	370	342	85	19,597
Other oaks	2,611	1,079	1,451	669	550	574	452	324	276	50	8,036
Chestnut oak	708	911	130	190	1	68	59	--	42	12	2,121
Hickory	1,871	2,319	1,862	779	630	246	240	44	122	22	8,135
Yellow birch	834	281	334	114	83	--	--	--	--	--	1,646
Sweet birch	4,820	760	199	235	124	30	29	--	28	--	6,225
Sugar maple	7,536	4,511	3,197	2,347	1,291	739	491	239	260	30	20,641
Red maple	12,357	6,814	5,152	2,925	1,654	789	628	344	289	9	30,961
Beech	1,788	953	1,706	623	431	347	263	150	255	53	6,569
Blackgum	926	--	159	371	--	90	--	--	31	--	1,577
White ash	7,473	2,527	1,716	967	727	622	365	19	74	12	14,502
Aspen	7,296	3,416	1,597	340	267	68	--	--	--	--	12,984
Basswood	2,043	1,230	618	61	1	136	117	69	36	--	4,311
Yellow-poplar	2,874	1,482	1,333	1,149	1,134	486	337	215	549	22	9,581
Black walnut	3,461	1,480	738	235	45	232	--	34	46	--	6,271
Black cherry	12,760	11,497	8,494	4,838	1,564	1,042	503	198	208	12	41,116
Black locust	1,205	2,848	786	314	--	36	62	--	22	--	5,273
Other hardwoods	2,729	3,429	1,972	1,069	703	615	220	69	147	--	10,953
Total hardwoods	79,281	53,448	37,185	21,961	11,487	7,832	4,820	2,316	3,103	478	221,911
Total, all species	93,113	60,169	41,257	23,387	11,810	8,003	4,904	2,375	3,130	478	248,626

[a] Includes white and swamp oaks.

[b] Includes scarlet, shingle, pin, and black oaks.

Table 32 .--Net volume of growing stock on commercial forest land, by species and diameter class, Western Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	13.8	15.0	18.6	5.3	2.4	0.7	--	--	0.5	--	56.3
Other yellow pines	13.2	11.3	14.4	3.2	--	1.6	--	--	--	--	43.7
Hemlock	10.7	9.5	6.4	7.0	1.9	2.1	2.3	2.3	0.9	--	43.1
Other softwoods	1.5	0.5	0.7	3.1	1.1	--	--	--	--	--	6.9
Total softwoods	39.2	36.3	40.1	18.6	5.4	4.4	2.3	2.3	1.4	--	150.0
Select white oaks[a]	4.9	12.2	20.2	30.3	21.8	21.2	13.9	11.1	20.2	15.1	170.9
Northern red oak	12.7	31.5	32.4	36.0	26.8	25.7	23.3	15.2	19.0	7.9	230.5
Other oaks[b]	9.2	5.8	12.9	9.4	10.7	14.7	14.4	13.6	14.3	4.2	109.2
Chestnut oak	2.1	4.8	1.5	2.7	W	2.1	2.3	--	1.9	1.1	18.5
Hickory	6.2	12.7	20.2	12.4	13.7	7.0	8.9	2.0	7.0	1.0	91.1
Yellow birch	2.2	1.2	2.4	1.4	1.4	--	--	--	--	--	8.6
Sweet birch	13.6	3.8	1.7	2.7	1.9	0.5	0.8	--	0.9	--	25.9
Sugar maple	26.5	25.9	30.4	33.8	27.9	20.9	18.6	11.1	15.5	3.0	213.6
Red maple	37.1	38.1	46.6	40.8	32.6	21.7	21.7	14.3	13.7	0.7	267.3
Beech	6.0	5.8	14.2	8.2	7.9	8.3	9.0	6.1	10.7	3.4	79.6
Blackgum	3.1	--	1.5	4.9	--	2.1	--	--	1.4	--	13.0
White ash	21.3	14.0	14.4	13.1	14.1	15.4	11.4	0.9	3.4	0.5	108.5
Aspen	19.6	17.0	13.5	4.9	5.0	1.9	--	--	--	--	61.9
Basswood	7.9	6.8	6.5	0.9	W	4.9	4.8	3.9	1.9	--	37.6
Yellow-poplar	9.1	8.1	11.3	14.4	22.3	12.5	11.2	9.2	26.2	1.7	126.0
Black walnut	6.9	5.3	5.1	3.1	1.1	5.3	--	1.1	1.3	--	29.2
Black cherry	35.2	57.5	77.7	67.8	31.3	29.6	18.4	8.2	12.6	1.2	339.5
Black locust	2.0	12.2	6.1	3.5	--	1.0	1.8	--	0.4	--	27.0
Other hardwoods	4.7	13.2	13.7	12.3	13.7	14.6	7.8	3.2	6.7	--	89.9
Total hardwoods	230.3	275.9	332.3	302.6	232.2	209.4	168.3	99.9	157.1	39.8	2,047.8
Total, all species	269.5	312.2	372.4	321.2	237.6	213.8	170.6	102.2	158.5	39.8	2,197.8

[a] Includes white and swamp white oaks.

[b] Includes scarlet, shingle, pin, and black oaks.

W-Less than 50,000 cubic feet.

Table 33.--Net volume of sawtimber on commercial forest land, by species and diameter class, Western Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	59.3	19.5	9.0	3.0	--	--	2.5	--	93.3
Other yellow pines	45.0	11.0	--	6.6	--	--	--	--	62.6
Hemlock	19.9	24.7	7.0	9.0	9.2	9.9	4.3	--	84.0
Other softwoods	1.8	13.5	5.4	--	--	--	--	--	20.7
Total softwoods	126.0	68.7	21.4	18.6	9.2	9.9	6.8	--	260.6
Select white oaks[b]	--	111.3	89.8	93.9	66.1	54.1	104.6	97.6	617.4
Northern red oak	--	135.3	113.0	116.9	110.7	74.1	97.4	45.8	693.2
Other oaks[c]	--	36.5	45.5	66.3	68.5	64.7	71.8	25.9	379.2
Chestnut oak	--	10.0	0.1	9.1	10.1	--	11.6	6.8	47.7
Hickory	--	49.1	60.3	33.1	43.6	9.6	36.4	9.3	241.4
Yellow birch	--	5.5	6.1	--	--	--	--	--	11.6
Sweet birch	--	10.4	8.3	2.7	3.6	--	6.6	--	31.6
Sugar maple	--	129.7	121.1	94.4	88.2	54.0	88.7	19.3	595.4
Red maple	--	150.6	139.7	97.2	100.2	68.0	77.8	3.7	637.2
Beech	--	31.1	33.8	37.9	44.2	29.9	68.2	22.6	267.7
Blackgum	--	19.0	--	10.1	--	--	8.9	--	38.0
White ash	--	50.0	60.1	70.8	58.9	4.5	19.8	5.9	270.0
Aspen	--	18.1	20.9	8.6	--	--	--	--	47.6
Basswood	--	3.5	0.2	22.1	22.0	18.2	11.0	--	77.0
Yellow-poplar	--	57.0	96.3	59.1	55.4	44.4	138.2	8.4	458.8
Black walnut	--	12.9	4.4	27.9	--	6.8	10.8	--	62.8
Black cherry	--	252.1	130.5	130.8	84.8	39.1	62.8	5.9	706.0
Black locust	--	14.9	--	4.3	9.1	--	5.3	--	33.6
Other hardwoods	--	52.7	60.7	70.8	38.6	14.5	37.1	--	274.4
Total hardwoods	--	1,149.7	990.8	956.0	804.0	481.9	857.0	251.2	5,490.6
Total, all species	126.0	1,218.4	1,012.2	974.6	813.2	491.8	863.8	251.2	5,751.2

[a] International 1/4-inch rule.
[b] Includes white and swamp white oaks.
[c] Includes scarlet, shingle, pin, and black oaks.

Table 34.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Western Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	--	2.3	86.2	4.8	93.3
Yellow pines	--	--	62.6	--	62.6
Other softwoods[c]	--	--	--	--	104.7
Total softwoods	--	2.3	148.8	4.8	260.6
Select white oaks[d]	90.2	101.5	294.3	131.4	617.4
Northern red oak	201.2	157.0	268.8	66.2	693.2
Other oaks[e]	97.8	74.3	134.4	72.7	379.2
Chestnut oak	23.7	4.2	17.2	2.6	47.7
Hickory	39.6	47.1	103.1	51.6	241.4
Yellow birch	0.1	4.6	6.3	0.6	11.6
Sweet birch	1.4	7.1	21.3	1.8	31.6
Sugar maple	95.2	142.1	282.7	75.4	595.4
Red maple	40.3	99.0	385.4	112.5	637.2
Beech	40.2	44.1	143.2	40.2	267.7
Blackgum	3.1	5.6	25.1	4.2	38.0
White ash	43.4	76.6	113.5	36.5	270.0
Aspen	2.7	9.0	28.6	7.3	47.6
Basswood	16.9	17.9	37.9	4.3	77.0
Yellow-poplar	67.6	110.5	173.9	106.8	458.8
Black walnut	11.3	7.6	33.5	10.4	62.8
Black cherry	88.5	108.5	411.0	98.0	706.0
Black locust	2.7	0.9	26.0	4.0	33.6
Other hardwoods	54.5	57.0	133.8	29.1	274.4
Total hardwoods	920.4	1,074.6	2,640.0	855.6	5,490.6
Hardwood quality (in percent)	17	19	48	16	100
Hardwood sampling error (in percent)	8	6	5	6	3.9

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes white and swamp white oaks.

[e] Includes scarlet, shingle, pin, and black oaks.

Table 35.--Sampling errors for major number of trees and timber-volume classes, Western Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 31)	Growing-stock volume (Table 32)	Sawtimber volume (Table 33)
White and red pines	62	58	65
Other yellow pines	34	33	46
Hemlock	55	46	42
Other softwoods	60	70	92
Select white oaks	20	16	16
Northern red oak	20	16	15
Other oaks	25	17	17
Chestnut oak	34	25	35
Hickory	22	21	26
Yellow birch	40	32	62
Sweet birch	48	39	34
Sugar maple	14	13	15
Red maples	13	11	13
Beech	30	19	18
Blackgum	33	28	35
White ash	18	15	16
Aspen	27	23	40
Basswood	39	32	46
Yellow-poplar	28	29	32
Black walnut	41	30	44
Black cherry	12	11	16
Black locust	39	35	53
Other hardwoods	26	19	22
Dbh classes (inches)			
5.0 to 6.9	9	8	--
7.0 to 8.9	8	7	--
9.0 to 10.9	7	6	41
11.0 to 12.9	8	7	8
13.0 to 14.9	8	7	7
15.0 to 16.9	10	9	8
17.0 to 18.9	10	9	8
19.0 to 20.9	13	12	11
21.0 to 28.9	14	13	10
29.0 +	20	20	19

Table 36.--Number of growing-stock trees on commercial forest land, by species and diameter class Southwestern Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	318	462	688	169	49	72	53	21	15	--	1,847
Virginia pine	346	113	147	61	W	--	--	19	--	--	686
Other yellow pines	443	17	87	9	6	21	--	--	--	--	583
Hemlock	1,913	1,531	945	731	290	178	53	39	17	--	5,697
Other softwoods	4	130	--	--	--	--	--	--	--	--	134
Total softwoods	3,024	2,253	1,867	970	345	271	106	79	32	--	8,947
White oak	3,926	3,307	2,523	901	483	185	136	26	116	--	11,603
Northern red oak	7,284	6,662	5,026	3,847	2,085	1,614	617	511	540	46	28,232
Other oaks[a]	1,783	3,122	1,929	681	992	166	268	108	208	14	9,271
Chestnut oak	10,748	9,523	5,664	3,079	1,373	818	404	185	79	--	31,873
Hickory	2,227	2,096	817	340	416	182	44	--	9	--	6,131
Yellow birch	45	235	234	4	W	--	--	--	W	--	518
Sweet birch	3,746	2,079	500	473	56	37	24	--	13	--	6,928
Sugar maple	5,902	4,285	2,060	1,231	775	471	174	168	70	9	15,145
Red maple	12,117	6,500	4,367	3,238	1,048	271	190	136	113	--	27,980
Beech	516	1,516	609	567	413	61	98	60	29	8	3,877
Blackgum	461	286	287	63	42	--	2	--	--	--	1,141
White ash	2,934	780	756	234	171	142	71	57	27	8	5,180
Aspen	789	175	112	120	44	27	--	--	--	--	1,267
Basswood	2,002	252	309	187	112	65	26	39	--	--	2,992
Yellow-poplar	1,009	709	664	382	276	146	59	74	61	--	3,380
Black walnut	--	--	--	--	--	5	--	--	--	--	5
Black cherry	6,996	4,011	2,046	1,802	1,417	460	355	172	111	--	17,370
Black locust	2,476	1,963	1,194	336	132	154	44	--	33	--	6,332
Other hardwoods	744	720	918	219	91	382	26	77	88	14	3,279
Total hardwoods	65,705	48,221	30,015	17,704	9,926	5,186	2,538	1,613	1,497	99	182,504
Total, all species	68,729	50,474	31,882	18,674	10,271	5,457	2,644	1,692	1,529	99	191,451

[a] Includes scarlet and black oaks.
W-Less than 500 trees.

Table 37.--Net volume of growing stock on commercial forest land, by species and diameter class, Southwestern Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	1.4	3.2	6.7	2.6	1.0	2.1	1.9	1.2	1.2	--	21.3
Virginia pine	0.9	0.6	1.3	0.7	W	--	--	0.7	--	--	4.2
Other yellow pines	0.9	0.1	0.7	0.1	0.2	1.0	--	--	--	--	3.0
Hemlock	8.3	9.2	8.3	9.7	5.7	5.2	2.0	2.3	1.2	--	51.9
Other softwoods	W	0.5	--	--	--	--	--	--	--	--	0.5
Total softwoods	11.5	13.6	17.0	13.1	6.9	8.3	3.9	4.2	2.4	--	80.9
White oak	9.6	20.3	28.4	17.6	13.1	7.3	6.3	1.2	8.1	--	111.9
Northern red oak	27.1	44.0	56.5	67.9	50.7	52.2	26.2	25.4	36.4	5.2	391.6
Other oaks[a]	6.2	18.6	19.9	11.6	23.2	5.3	11.0	5.4	12.8	1.7	115.7
Chestnut oak	38.0	58.9	58.5	49.2	30.7	24.0	15.1	8.0	4.1	--	286.5
Hickory	8.0	15.8	10.1	7.1	10.5	6.8	2.1	--	0.8	--	61.2
Yellow birch	0.2	1.8	2.5	0.1	W	--	--	--	W	--	4.6
Sweet birch	14.0	12.9	5.1	6.9	1.3	1.0	0.9	--	0.6	--	42.7
Sugar maple	23.6	26.4	22.0	19.3	16.1	13.4	6.4	8.4	5.3	1.0	141.9
Red maple	43.5	43.9	47.8	53.4	25.1	8.4	7.1	6.2	6.0	--	241.4
Beech	1.9	8.9	6.3	9.2	9.0	2.1	3.7	2.7	1.5	0.7	46.0
Blackgum	1.7	1.8	2.6	1.0	0.9	--	0.1	--	--	--	8.1
White ash	10.1	4.5	7.2	3.5	3.6	4.1	3.0	3.1	2.1	2.0	43.2
Aspen	2.5	0.9	1.1	2.3	0.9	0.9	--	--	--	--	8.6
Basswood	7.1	2.4	3.5	3.6	3.3	2.3	1.2	2.1	--	--	25.5
Yellow-poplar	4.1	5.4	8.5	6.8	7.2	5.1	2.3	4.3	3.8	--	47.5
Black walnut	--	--	--	--	--	0.1	--	--	--	--	0.1
Black cherry	24.8	24.8	21.4	28.7	31.3	13.4	12.8	7.2	5.8	--	170.2
Black locust	5.7	11.7	12.7	6.0	3.7	6.0	1.9	--	1.7	--	49.4
Other hardwoods	1.5	4.5	10.3	4.1	2.2	13.7	1.2	4.6	6.2	1.3	49.6
Total hardwoods	229.6	307.5	324.4	298.3	232.8	166.1	101.3	78.6	95.2	11.9	1,845.7
Total, all species	241.1	321.1	341.4	311.4	239.7	174.4	105.2	82.8	97.6	11.9	1,926.6

[a] Includes scarlet and black oaks.
W-Less than 50,000 cubic feet.

Table 38.--Net volume of sawtimber on commercial forest land, by species and diameter class, Southwestern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	23.7	11.7	4.2	9.0	9.5	6.8	5.2	--	70.1
Virginia pine	4.5	3.4	W	--	--	3.5	--	--	11.4
Other yellow pines	2.5	0.7	0.9	5.1	--	--	--	--	9.2
Hemlock	27.5	37.2	23.5	21.2	9.4	9.7	5.8	--	134.3
Total softwoods	58.2	53.0	28.6	35.3	18.9	20.0	11.0	--	225.0
White oak	--	71.8	59.2	34.0	30.6	6.3	48.7	--	250.6
Northern red oak	--	274.6	224.2	243.8	127.5	134.3	205.6	31.6	1,241.6
Other oaks[b]	--	49.5	109.0	25.5	57.7	28.1	75.7	10.0	355.5
Chestnut oak	--	202.5	138.0	115.4	75.5	42.5	23.5	--	597.4
Hickory	--	28.8	48.6	33.8	10.5	--	4.8	--	126.5
Yellow birch	--	0.3	W	--	--	--	W	--	0.3
Sweet birch	--	26.8	5.2	4.3	4.8	--	3.8	--	44.9
Sugar maple	--	78.7	72.9	64.9	33.8	46.8	32.7	6.0	335.8
Red maple	--	209.3	111.5	38.5	36.5	31.3	37.6	--	464.7
Beech	--	33.7	38.1	8.4	18.0	13.1	7.8	4.0	123.1
Blackgum	--	4.1	4.0	--	0.5	--	--	--	8.6
White ash	--	13.8	16.0	19.3	15.1	15.8	12.4	11.7	104.1
Aspen	--	9.0	3.7	3.9	--	--	--	--	16.6
Basswood	--	15.3	15.4	11.7	6.3	10.6	--	--	59.3
Yellow-poplar	--	26.0	30.1	23.6	11.7	22.1	20.6	--	134.1
Black walnut	--	--	--	0.8	--	--	--	--	0.8
Black cherry	--	115.3	131.5	59.2	62.9	37.2	30.7	--	436.8
Black locust	--	24.6	16.4	28.2	10.3	--	10.1	--	89.6
Other hardwoods	--	15.6	10.2	61.5	5.8	23.0	33.9	8.8	158.8
Total hardwoods	--	1,199.7	1,034.0	776.8	507.5	411.1	547.9	72.1	4,549.1
Total, all species	58.2	1,252.7	1,062.6	812.1	526.4	431.1	558.9	72.1	4,774.1

[a] International 1/4-inch rule.
[b] Includes scarlet and black oaks.
W-Less than 50,000 board feet.

Table 39.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Southwestern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	7.7	15.0	27.6	19.8	70.1
Yellow pines	2.0	6.6	12.0	--	20.6
Other softwoods[c]	--	--	--	--	134.3
Total	9.7	21.6	39.6	19.8	225.0
White oak	28.2	34.8	122.4	65.2	250.6
Northern red oak	312.1	300.8	519.5	109.2	1,241.6
Other oaks[d]	65.3	67.0	134.9	88.3	355.5
Chestnut oak	50.0	154.2	309.9	83.3	597.4
Hickory	4.7	27.1	64.9	29.8	126.5
Yellow birch	--	--	0.2	0.1	0.3
Sweet birch	3.5	6.5	26.1	8.8	44.9
Sugar maple	62.1	65.4	157.1	51.2	335.8
Red maple	32.2	75.8	278.5	78.2	464.7
Beech	17.3	14.1	47.8	43.9	123.1
Blackgum	--	--	7.4	1.2	8.6
White ash	29.8	35.8	30.5	8.0	104.1
Aspen	W	W	7.0	9.6	16.6
Basswood	3.4	9.5	42.5	3.9	59.3
Yellow-poplar	29.0	24.5	48.8	31.8	134.1
Black walnut	0.5	0.3	--	--	0.8
Black cherry	29.0	62.2	268.2	77.4	436.8
Black locust	3.0	23.5	53.2	9.9	89.6
Other hardwoods	35.0	50.4	53.2	20.2	158.8
Total hardwoods	705.1	951.9	2,172.1	720.0	4,549.1
Hardwood quality (in percent)	15	21	48	16	100
Hardwood sampling error (in percent)	9	6	5	7	4.4

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes scarlet and black oaks.

W-Less than 50,000 board feet.

Table 40.--Sampling errors for major number of trees and timber-volume classes, Southwestern Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 36)	Growing-stock volume (Table 37)	Sawtimber volume Table 38)
White and red pines	52	45	49
Virginia pine	59	50	52
Other yellow pines	56	41	50
Hemlock	31	27	34
Other softwoods	96	95	--
Select white oaks	19	16	19
Northern red oak	14	10	11
Other oaks	17	13	15
Chestnut oak	15	14	20
Hickory	26	22	26
Yellow birch	42	43	47
Sweet birch	17	16	30
Sugar maple	17	17	24
Red maples	12	11	16
Beech	34	33	36
Blackgum	43	40	67
White ash	28	24	35
Aspen	66	48	48
Basswood	48	34	42
Yellow-poplar	38	28	30
Black walnut	100	99	96
Black cherry	16	14	18
Black locust	25	26	35
Other hardwoods	25	26	34
Dbh classes (inches)			
5.0 to 6.9	10	10	--
7.0 to 8.9	8	7	--
9.0 to 10.9	7	6	42
11.0 to 12.9	8	6	8
13.0 to 14.9	8	7	7
15.0 to 16.9	11	10	9
17.0 to 18.9	12	11	11
19.0 to 20.9	13	13	11
21.0 to 28.9	15	14	13
29.0+	35	35	33

Table 41 .--Number of growing-stock trees on commercial forest land, by species and diameter class, Allegheny Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	3,168	2,043	1,036	446	107	267	121	51	202	--	7,441
Other yellow pines	11	255	11	134	40	9	--	--	--	--	460
Hemlock	16,955	7,726	2,317	2,048	1,257	852	331	390	206	8	32,090
Other softwoods	498	556	232	--	--	--	--	--	--	--	1,286
Total softwoods	20,632	10,580	3,596	2,628	1,404	1,128	452	441	408	8	41,277
White oak	4,140	3,393	2,651	1,621	687	296	146	119	73	--	13,126
Northern red oak	2,746	2,606	3,386	3,120	2,906	1,543	1,391	695	682	53	19,128
Other oaks[a]	1,112	2,143	1,322	1,484	1,045	363	408	43	77	--	7,997
Chestnut oak	5,409	4,767	3,918	1,377	697	484	306	41	113	--	17,112
Hickory	2,268	2,824	1,173	970	218	153	48	--	17	--	7,671
Yellow birch	5,439	2,968	1,781	692	317	64	76	2	46	--	11,385
Sweet birch	15,460	9,187	4,703	1,267	361	325	93	20	16	--	31,432
Sugar maple	36,974	31,887	15,077	7,859	4,670	1,934	850	280	282	73	99,886
Red maples[b]	45,954	38,082	23,600	11,329	6,191	1,856	1,059	372	267	22	128,732
Beech	18,246	11,060	6,321	3,446	2,159	1,211	658	416	210	--	43,727
Blackgum	61	139	81	--	--	--	--	--	--	--	281
White ash	2,542	2,889	4,181	3,086	1,309	887	370	406	52	--	15,722
Aspen	9,129	7,658	5,440	2,041	676	240	52	18	--	--	25,254
Basswood	1,289	2,287	1,236	625	598	325	37	75	36	--	6,508
Yellow-poplar	50	290	668	467	479	292	105	68	46	--	2,465
Black walnut	--	--	103	178	135	67	--	22	38	--	543
Black cherry	13,573	12,832	12,806	8,349	5,409	3,335	1,796	849	682	35	59,666
Black locust	--	W	53	W	--	--	--	--	--	--	53
Other hardwoods	3,230	2,353	1,565	707	495	102	72	60	58	--	8,642
Total hardwoods	167,622	137,365	90,065	48,618	28,352	13,477	7,467	3,486	2,695	183	499,330
Total, all species	188,254	147,945	93,661	51,246	29,756	14,605	7,919	3,927	3,103	191	540,607

[a] Includes scarlet and black oaks.
[b] Includes 955,000 silver maple trees.
W-Less than 500 trees.

Table 42.--Net volume of growing stock on commercial forest land, by species and diameter class, Allegheny Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	15.3	14.1	11.1	6.6	2.5	8.9	5.4	2.1	12.9	--	78.9
Other yellow pines	W	1.0	0.1	1.7	1.0	0.2	--	--	--	--	4.0
Hemlock	59.8	44.6	22.0	30.3	27.5	25.0	13.4	19.2	16.4	1.1	259.3
Other softwoods	1.0	3.7	2.4	--	--	--	--	--	--	--	7.1
Total softwoods	76.1	63.4	35.6	38.6	31.0	34.1	18.8	21.3	29.3	1.1	349.3
White oak	13.4	21.8	31.5	30.6	17.7	10.3	6.4	6.8	6.3	--	144.8
Northern red oak	9.3	17.6	41.5	59.4	80.0	58.1	68.4	42.9	55.9	7.0	440.1
Other oaks[a]	4.4	14.0	15.9	25.1	27.7	11.8	19.0	2.9	5.0	--	125.8
Chestnut oak	17.5	29.7	39.1	21.9	15.5	13.2	10.8	1.9	4.6	--	154.2
Hickory	9.4	20.6	13.4	17.9	5.2	4.8	2.3	--	1.1	--	74.7
Yellow birch	20.0	20.4	18.6	11.2	7.4	2.1	2.5	0.1	2.5	--	84.8
Sweet birch	57.5	66.6	53.7	21.8	7.9	9.5	3.7	0.7	0.8	--	222.2
Sugar maple	166.3	258.1	201.6	161.8	131.6	70.6	40.2	16.1	21.7	11.4	1,079.4
Red maples[b]	177.5	298.0	307.0	227.7	175.6	71.2	50.6	22.2	18.7	4.1	1,352.6
Beech	71.6	85.4	76.2	62.7	57.2	43.5	28.9	22.9	16.3	--	464.7
Blackgum	0.1	1.1	1.0	--	--	--	--	--	--	--	2.2
White ash	8.4	23.9	55.8	62.3	37.1	32.5	18.7	25.8	3.5	--	268.0
Aspen	30.8	54.5	67.0	40.6	18.6	9.3	2.5	0.9	--	--	224.2
Basswood	6.3	20.9	20.3	15.2	20.3	15.3	2.1	5.7	2.6	--	108.7
Yellow-poplar	0.2	1.9	8.9	10.5	14.8	12.1	5.4	5.0	3.2	--	62.0
Black walnut	--	--	0.8	2.8	3.3	2.4	--	1.3	2.0	--	12.6
Black cherry	52.1	92.9	164.0	174.8	158.7	135.0	92.9	57.1	69.0	4.3	1,000.8
Black locust	--	W	0.5	W	--	--	--	--	--	--	0.5
Other hardwoods	10.2	14.0	17.7	12.8	14.3	3.7	3.1	3.4	3.6	--	82.8
Total hardwoods	655.0	1,041.4	1,134.5	959.1	792.9	505.4	357.5	215.7	216.8	26.8	5,905.1
Total, all species	731.1	1,104.8	1,170.1	997.7	823.9	539.5	376.3	237.0	246.1	27.9	6,254.4

[a] Includes scarlet and black oaks.

[b] Includes 14.0 million cubic feet of silver maple.

W-Less than 50,000 cubic feet.

Table 43 .--Net volume of sawtimber on commercial forest land, by species and diameter class, Allegheny Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	39.1	24.5	11.3	37.6	24.3	5.7	56.4	--	198.9
Other yellow pines	0.4	5.7	4.5	1.2	--	--	--	--	11.8
Hemlock	69.3	104.0	107.7	101.4	59.5	73.3	75.0	4.6	594.8
Other softwoods	8.2	--	--	--	--	--	--	--	8.2
Total softwoods	117.0	134.2	123.5	140.2	83.8	79.0	131.4	4.6	813.7
White oak	--	112.0	70.9	44.3	31.2	30.9	32.0	--	321.3
Northern red oak	--	226.3	334.9	256.3	308.5	194.4	262.9	33.2	1,616.5
Other oaks[b]	--	112.1	112.6	50.1	81.3	15.3	25.2	--	396.6
Chestnut oak	--	95.2	62.6	61.8	52.2	9.5	23.9	--	305.2
Hickory	--	69.6	23.9	22.1	11.0	--	4.7	--	131.3
Yellow birch	--	35.9	23.6	8.7	10.8	0.5	4.5	--	84.0
Sweet birch	--	69.8	32.1	41.9	7.6	3.3	4.2	--	158.9
Sugar maple	--	576.3	519.9	305.8	158.4	74.9	96.4	48.5	1,780.2
Red maples[c]	--	730.9	643.9	290.7	220.2	103.8	91.8	20.9	2,102.2
Beech	--	217.5	224.9	187.9	115.3	92.8	67.0	--	905.4
White ash	--	219.3	150.1	136.0	88.4	122.9	15.9	--	732.6
Aspen	--	149.1	77.3	40.0	11.5	4.9	--	--	282.8
Basswood	--	58.7	93.9	67.8	8.7	25.9	12.4	--	267.4
Yellow-poplar	--	34.6	64.2	52.6	24.7	33.1	16.4	--	225.6
Black walnut	--	9.0	14.2	11.0	--	6.2	11.1	--	51.5
Black cherry	--	575.8	605.6	552.5	383.6	250.3	296.0	23.9	2,687.7
Black locust	--	W	--	--	--	--	--	--	W
Other hardwoods	--	43.9	54.2	16.5	15.5	17.3	20.2	--	167.6
Total hardwoods	--	3,336.0	3,108.8	2,146.0	1,528.9	986.0	984.6	126.5	12,216.8
Total, all species	117.0	3,470.2	3,232.3	2,286.2	1,612.7	1,065.0	1,116.0	131.1	13,030.5

[a] International 1/4-inch rule.
[b] Includes scarlet and black oaks.
[c] Includes 38.1 million board feet of silver maple.
W-Less than 50,000 board feet.

Table 44 .--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Allegheny Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	5.7	48.5	88.8	55.9	198.9
Yellow pines	0.7	3.1	8.0	--	11.8
Other softwoods[c]	--	--	--	--	603.0
Total softwoods	6.4	51.6	96.8	55.9	813.7
White oak	48.0	73.3	146.8	53.2	321.3
Northern red oak	489.1	406.3	534.3	186.8	1,616.5
Other oaks[d]	32.6	74.3	172.6	117.1	396.6
Chestnut oak	36.7	64.3	152.4	51.8	305.2
Hickory	5.0	36.7	63.0	26.6	131.3
Yellow birch	2.8	17.3	53.6	10.3	84.0
Sweet birch	9.1	29.2	84.5	36.1	158.9
Sugar maple	249.9	378.9	884.7	266.7	1,780.2
Red maples[e]	104.3	386.3	1,312.3	299.3	2,102.2
Beech	42.3	169.0	477.7	216.4	905.4
White ash	179.1	171.7	310.8	71.0	732.6
Aspen	6.3	43.3	169.2	64.0	282.8
Basswood	39.0	48.8	147.8	31.8	267.4
Yellow-poplar	59.0	63.9	77.2	25.5	225.6
Black walnut	3.9	1.3	42.0	4.3	51.5
Black cherry	442.8	744.5	1,254.4	246.0	2,687.7
Black locust	--	--	W	--	W
Other hardwoods	21.1	31.7	101.4	13.4	167.6
Total hardwoods	1,771.0	2,740.8	5,984.7	1,720.3	12,216.8
Hardwood quality (in percent)	15	22	49	14	100
Hardwood sampling error (in percent)	6	4	3	5	2.2

[a] International 1/4-inch rule

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes scarlet and black oaks.

[e] Includes 38.1 million board feet of silver maple.

[W] Less than 50,000 board feet.

Table 45.--Sampling errors for major number of trees and timber-volume classes, Allegheny Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 41)	Growing-stock volume (Table 42)	Sawtimber volume (Table 43)
White and red pines	45	36	30
Other yellow pines	46	48	59
Hemlock	19	15	17
Other softwoods	59	57	78
Select white oaks	19	16	19
Northern red oak	12	12	12
Other oaks	21	23	22
Chestnut oak	17	20	24
Hickory	26	25	26
Yellow birch	15	14	24
Sweet birch	15	14	21
Sugar maple	9	8	11
Red maples	9	8	11
Beech	13	11	14
Blackgum	54	61	--
White ash	16	14	14
Aspen	18	17	23
Basswood	18	17	19
Yellow-poplar	29	29	30
Black walnut	71	78	85
Black cherry	15	10	11
Black locust	86	82	64
Other hardwoods	34	25	40
Dbh classes (inches)			
5.0 to 6.9	5	5	--
7.0 to 8.9	5	4	--
9.0 to 10.9	4	4	33
11.0 to 12.9	4	4	5
13.0 to 14.9	5	5	4
15.0 to 16.9	7	6	5
17.0 to 18.9	8	8	7
19.0 to 20.9	10	10	9
21.0 to 28.9	10	10	8
29.0 +	40	38	37

Table 46.--Number of growing-stock trees on commercial forest land, by species and diameter class, North-Central Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	All classes
White and red pines	6,993	3,373	2,508	942	504	367	466	139	281	35	15,608
Virginia pine	773	144	64	62	W	--	--	--	--	--	1,043
Other yellow pines	3,121	445	798	594	213	214	--	--	--	--	5,385
Hemlock	9,334	6,498	3,387	2,548	1,530	783	429	175	205	--	24,889
Other softwoods	974	280	--	--	--	--	--	--	--	--	1,254
Total softwoods	21,195	10,740	6,757	4,146	2,247	1,364	895	314	486	35	48,179
Select white oaks[a]	11,750	7,894	6,139	3,328	2,244	999	818	363	223	--	33,758
Northern red oak	8,728	5,887	6,451	5,819	3,433	2,169	1,380	761	668	96	35,392
Other oaks[b]	6,883	4,121	2,659	2,496	1,970	797	506	190	211	20	19,853
Chestnut oak	14,477	13,625	6,557	4,372	2,154	1,122	478	198	122	--	43,105
Hickory	1,275	1,359	996	1,331	406	152	147	--	34	--	5,700
Yellow birch	2,295	1,093	446	103	18	44	47	--	17	--	4,063
Sweet birch	10,836	6,364	2,937	1,073	697	372	30	37	--	--	22,346
Sugar maple	5,823	3,397	2,861	1,658	1,097	443	241	76	76	15	15,687
Red maple	40,083	19,369	10,289	4,807	1,804	954	607	165	144	17	78,239
Beech	1,990	872	884	594	551	287	162	114	105	7	5,566
Blackgum	1,731	168	107	W	99	74	3	--	30	--	2,212
White ash	2,074	2,015	1,342	827	546	251	262	39	32	11	7,399
Aspen	5,186	4,759	2,368	519	288	88	--	--	--	--	13,208
Basswood	640	969	1,133	1,049	304	203	--	20	--	--	4,318
Yellow-poplar	59	377	683	348	230	158	130	126	63	--	2,174
Black walnut	--	--	94	--	--	20	--	--	--	--	114
Black cherry	4,293	6,130	4,276	1,760	835	520	230	42	63	--	18,149
Black locust	972	1,242	501	118	161	--	27	--	16	--	3,037
Other hardwoods	597	388	583	228	628	111	54	--	--	--	2,589
Total hardwoods	119,692	80,029	51,306	30,430	17,465	8,764	5,122	2,131	1,804	166	316,909
Total, all species	140,887	90,769	58,063	34,576	19,712	10,128	6,017	2,445	2,290	201	365,088

[a] Includes white and bur oaks.

[b] Includes scarlet and black oaks.

W-Less than 500 trees.

Table 47 .--Net volume of growing stock on commercial forest land, by species and diameter class, North-Central Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0-	
White and red pines	32.9	23.9	26.8	15.3	11.6	11.1	17.9	7.3	19.0	4.2	170.0
Virginia pine	0.8	0.4	0.7	0.7	W	--	--	--	--	--	2.6
Other yellow pines	3.7	2.0	6.6	8.7	5.1	8.7	--	--	--	--	34.8
Hemlock	33.4	37.8	30.9	34.9	31.4	21.2	16.3	8.7	13.4	--	228.0
Other softwoods	1.1	1.1	--	--	--	--	--	--	--	--	2.2
Total softwoods	71.9	65.2	65.0	59.6	48.1	41.0	34.2	16.0	32.4	4.2	437.6
Select white oaks[a]	35.7	49.4	64.1	57.0	52.2	33.6	33.8	19.1	15.8	--	360.7
Northern red oak	31.8	39.7	82.8	123.5	93.4	77.6	62.3	42.3	48.2	10.3	611.9
Other oaks[b]	24.2	27.1	30.1	42.3	43.6	25.8	22.5	10.6	12.9	2.5	241.6
Chestnut oak	47.2	84.8	67.6	66.8	46.3	31.1	17.1	9.1	6.6	--	376.6
Hickory	4.5	8.6	10.0	22.3	10.4	5.3	6.4	--	2.1	--	69.6
Yellow birch	8.5	7.1	4.6	1.7	0.5	1.2	1.5	--	1.0	--	26.1
Sweet birch	39.3	42.5	28.6	15.0	14.1	9.8	1.1	1.6	--	--	152.0
Sugar maple	25.4	28.2	36.2	31.3	28.8	15.7	10.8	3.9	5.8	1.7	187.8
Red maple	138.2	130.7	118.2	84.6	44.5	31.3	25.0	8.5	8.7	1.5	591.2
Beech	7.6	6.4	10.1	11.3	13.6	9.3	7.3	5.9	7.5	0.6	79.6
Blackgum	5.6	1.4	1.0	W	3.1	2.6	0.1	--	2.0	--	15.8
White ash	6.9	13.7	16.0	15.8	13.5	9.6	12.9	2.1	2.7	1.4	94.6
Aspen	17.2	29.0	28.8	10.1	8.0	3.2	--	--	--	--	96.3
Basswood	3.3	8.8	19.0	28.2	10.4	8.8	--	1.4	--	--	79.9
Yellow-poplar	0.2	2.7	9.3	7.5	6.0	5.4	5.5	7.1	3.9	--	47.6
Black walnut	--	--	0.9	--	--	0.6	--	--	--	--	1.5
Black cherry	16.1	38.5	49.2	31.5	21.2	17.5	9.9	2.3	6.4	--	192.6
Black locust	2.7	8.5	4.7	2.0	4.3	--	1.2	--	0.9	--	24.3
Other hardwoods	2.4	2.6	6.3	4.0	15.1	3.4	2.3	--	--	--	36.1
Total hardwoods	416.8	529.7	587.5	554.9	429.0	291.8	219.7	113.9	124.5	18.0	3,285.8
Total, all species	488.7	594.9	652.5	614.5	477.1	332.8	253.9	129.9	156.9	22.2	3,723.4

[a] Includes white and bur oaks.

[b] Includes scarlet and black oaks.

W-Less than 50,000 cubic feet.

Table 48 .--Net volume of sawtimber on commercial forest land, by species and diameter class, North-Central Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	90.5	60.3	46.2	48.0	79.5	35.7	92.0	21.8	474.0
Virginia pine	2.2	2.6	W	--	--	--	--	--	4.8
Other yellow pines	21.3	31.9	21.7	40.4	--	--	--	--	115.3
Hemlock	95.9	124.6	118.9	86.6	66.0	35.3	58.5	--	585.8
Total softwoods	209.9	219.4	186.8	175.0	145.5	71.0	150.5	21.8	1,179.9
Select white oaks[b]	--	207.4	194.9	140.7	146.6	87.1	75.6	--	852.3
Northern red oak	--	469.6	388.8	326.6	262.1	196.0	229.2	47.6	1,919.9
Other oaks[c]	--	162.0	184.2	107.8	100.0	48.5	60.7	11.8	675.0
Chestnut oak	--	237.3	180.8	142.5	74.4	41.2	34.1	--	710.3
Hickory	--	78.5	39.8	22.3	26.9	--	9.2	--	176.7
Yellow birch	--	5.7	1.0	4.9	6.8	--	4.4	--	22.8
Sweet birch	--	54.3	59.1	42.6	3.6	7.4	--	--	167.0
Sugar maple	--	107.1	126.6	64.5	43.3	16.7	27.2	8.4	393.8
Red maples	--	298.0	167.8	127.2	103.2	36.8	41.2	6.7	780.9
Beech	--	39.4	51.9	38.6	31.3	25.3	34.6	2.7	223.8
Blackgum	--	W	14.7	12.5	0.7	--	8.7	--	36.6
White ash	--	54.8	52.1	39.5	69.5	8.7	12.7	6.6	243.9
Aspen	--	37.4	34.1	12.3	--	--	--	--	83.8
Basswood	--	96.2	42.4	38.7	--	5.3	--	--	182.6
Yellow-poplar	--	28.5	25.1	21.9	23.6	35.0	17.2	--	151.3
Black walnut	--	--	--	3.3	--	--	--	--	3.3
Black cherry	--	108.5	76.6	68.8	38.5	9.3	27.1	--	328.8
Black locust	--	6.9	16.8	--	4.7	--	4.6	--	33.0
Other hardwoods	--	14.8	65.6	14.8	10.4	--	--	--	105.6
Total hardwoods	--	2,006.4	1,722.3	1,229.5	945.6	517.3	586.5	83.8	7,091.4
Total, all species	209.9	2,225.8	1,909.1	1,404.5	1,091.1	588.3	737.0	105.6	8,271.3

[a] International 1/4-inch rule.
[b] Includes white and bur oaks.
[c] Includes scarlet and black oaks.
W-Less than 50,000 board feet.

Table 49.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, North-Central Unit, Pennsylvania, 1978.
(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	15.6	51.6	236.4	170.4	474.0
Yellow pines	5.1	33.1	81.9	--	120.1
Other softwoods[c]	--	--	--	--	585.8
Total softwoods	20.7	84.7	318.3	170.4	1,179.9
Select white oaks[d]	152.3	189.2	356.6	154.2	852.3
Northern red oak	445.0	466.3	789.1	219.5	1,919.9
Other oaks[e]	73.9	118.3	298.3	184.5	675.0
Chestnut oak	43.8	168.8	347.9	149.8	710.3
Hickory	13.9	32.1	91.5	39.2	176.7
Yellow birch	2.6	1.8	14.5	3.9	22.8
Sweet birch	1.4	46.2	101.8	17.6	167.0
Sugar maple	43.8	88.9	197.0	64.1	393.8
Red maple	61.9	142.2	457.5	119.3	780.9
Beech	23.9	51.8	108.4	39.7	223.8
Blackgum	2.7	10.9	18.6	4.4	36.6
White ash	57.5	38.1	115.2	33.1	243.9
Aspen	3.0	10.0	57.8	13.0	83.8
Basswood	13.0	39.4	109.1	21.1	182.6
Yellow-poplar	49.1	38.3	44.9	19.0	151.3
Black walnut	1.9	1.4	--	--	3.3
Black cherry	40.0	70.7	179.5	38.6	328.8
Black locust	--	--	28.4	4.6	33.0
Other hardwoods	18.5	21.2	53.2	12.7	105.6
Total hardwoods	1,048.2	1,535.6	3,369.3	1,138.3	7,091.4
Hardwood quality (in percent)	15	22	47	16	100
Hardwood sampling error (in percent)	9	5	5	6	3.5

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes white and bur oaks.

[e] Includes scarlet and black oaks.

Table 50.--Sampling errors for major number of trees and timber-volume classes, North-Central Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 46)	Growing-stock volume (Table 47)	Sawtimber volume (Table 48)
White and red pines	19	20	24
Virginia pine	79	77	100
Other yellow pines	31	28	32
Hemlock	19	17	19
Other softwoods	70	64	--
Select white oaks	11	10	14
Northern red oak	12	9	10
Other oaks	16	13	14
Chestnut oak	12	11	15
Hickory	20	18	21
Yellow birch	26	20	36
Sweet birch	16	19	23
Sugar maple	16	16	21
Red maples	9	8	11
Beech	18	24	31
Blackgum	32	43	67
White ash	21	19	22
Aspen	18	18	32
Basswood	40	36	35
Yellow-poplar	25	24	26
Black walnut	83	66	59
Black cherry	13	11	15
Black locust	78	62	70
Other hardwoods	21	21	26
Dbh classes (inches)			
5.0 to 6.9	6	7	--
7.0 to 8.9	5	5	--
9.0 to 10.9	5	4	17
11.0 to 12.9	6	5	6
13.0 to 14.9	6	6	5
15.0 to 16.9	7	7	6
17.0 to 18.9	9	8	7
19.0 to 20.9	13	12	12
21.0 to 28.9	12	11	10
29.0 +	44	36	33

Table 51 .--Number of growing-stock trees on commercial forest land, by species and diameter class, South-Central Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	3,566	2,288	855	813	299	123	153	80	41	--	8,218
Virginia pine	3,105	2,255	1,262	181	40	--	--	--	--	--	6,843
Other yellow pines	525	892	547	240	38	16	--	--	--	--	2,258
Hemlock	1,918	822	232	457	51	117	120	24	37	7	3,785
Other softwoods	1,213	321	412	--	--	--	--	--	--	--	1,946
Total softwoods	10,327	6,578	3,308	1,691	428	256	273	104	78	7	23,050
White oak	5,551	4,173	3,796	1,231	1,003	309	340	234	90	--	16,727
Northern red oak	8,367	4,474	4,093	2,811	1,525	1,335	729	568	656	62	24,620
Other oaks[a]	2,365	3,680	3,986	3,532	1,411	761	539	210	306	9	16,799
Chestnut oak	9,419	9,664	8,520	4,910	3,726	1,780	1,161	327	371	7	39,885
Hickory	842	1,771	1,696	819	345	337	--	--	51	--	5,861
Yellow birch	51	132	61	9	W	--	--	--	W	--	253
Sweet birch	6,782	3,752	1,583	476	305	198	201	133	33	--	13,463
Sugar maple	1,783	711	679	376	71	1	--	49	36	--	3,706
Red maple	12,479	5,694	1,859	1,411	524	W	71	--	32	11	22,081
Beech	385	37	29	153	50	--	W	30	--	--	684
Blackgum	2,574	580	277	61	72	44	115	25	49	--	3,797
White ash	2,886	1,654	1,220	1,188	613	616	175	56	51	10	8,469
Aspen	4	80	7	5	--	--	--	--	--	--	96
Basswood	339	519	105	1	133	74	87	29	40	11	1,338
Yellow-poplar	652	808	283	411	473	372	231	104	58	7	3,399
Black walnut	--	136	122	82	62	58	--	--	--	--	460
Black cherry	1,781	1,314	568	267	W	2	--	28	19	--	3,979
Black locust	1,638	1,840	1,244	351	213	161	55	--	16	--	5,518
Other hardwoods	2,727	1,182	1,340	685	419	125	--	54	50	7	6,589
Total hardwoods	60,625	42,201	31,468	18,779	10,945	6,173	3,704	1,847	1,858	124	177,724
Total, all species	70,952	48,779	34,776	20,470	11,373	6,429	3,977	1,951	1,936	131	200,774

[a] Includes scarlet, southern red, pin, post, and black oaks.

W-Less than 500 trees.

Table 52 .--Net volume of growing stock on commercial forest land, by species and diameter class, South-Central Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.0	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	22.1	20.4	12.2	15.9	8.9	3.2	8.7	4.9	3.1	--	99.4
Virginia pine	4.6	12.8	12.8	3.8	1.1	--	--	--	--	--	35.1
Other yellow pines	0.9	4.1	4.3	3.7	1.0	0.5	--	--	--	--	14.5
Hemlock	8.6	5.2	2.1	9.2	1.3	4.6	5.2	2.0	3.7	1.2	43.1
Other softwoods	1.7	1.3	3.4	--	--	--	--	--	--	--	6.4
Total softwoods	37.9	43.8	34.8	32.6	12.3	8.3	13.9	6.9	6.8	1.2	198.5
White oak	16.8	27.3	44.5	25.8	32.5	11.3	17.8	17.2	9.7	--	202.9
Northern red oak	27.3	29.9	50.4	52.0	45.7	51.9	36.6	35.9	62.1	9.0	400.8
Other oaks[a]	8.8	24.7	45.2	64.9	37.0	28.8	29.8	14.6	20.2	1.2	275.2
Chestnut oak	31.2	60.0	90.9	82.6	93.0	56.4	50.3	18.0	25.7	1.2	509.3
Hickory	3.3	13.4	21.3	16.5	11.3	15.0	--	--	6.6	--	87.4
Yellow birch	0.2	0.8	0.7	0.1	W	--	--	--	W	--	1.8
Sweet birch	24.5	24.3	14.1	7.9	6.4	6.8	7.6	6.1	2.1	--	99.8
Sugar maple	7.4	5.5	8.3	8.5	1.8	W	--	3.0	3.0	--	37.5
Red maple	40.5	36.6	19.8	25.3	13.9	W	4.5	--	2.9	1.2	144.7
Beech	0.9	0.3	0.4	3.1	1.6	--	W	2.4	--	--	8.7
Blackgum	8.9	4.2	3.0	1.3	1.9	1.5	5.9	1.5	4.8	--	33.0
White ash	10.1	12.3	15.6	22.7	18.7	26.4	9.6	3.7	4.5	1.4	125.0
Aspen	W	0.6	0.1	0.1	--	--	--	--	--	--	0.8
Basswood	0.7	2.9	1.7	W	4.6	4.0	6.0	1.4	2.6	1.0	24.9
Yellow-poplar	1.8	5.0	3.5	7.1	11.7	13.5	11.1	5.8	4.8	1.2	65.5
Black walnut	--	0.9	2.0	1.2	1.4	1.7	--	--	--	--	7.2
Black cherry	6.5	7.2	4.9	4.1	W	W	--	1.6	2.0	--	26.3
Black locust	4.5	10.5	14.6	6.1	5.9	6.1	2.7	--	1.7	--	52.1
Other hardwoods	10.4	7.4	16.6	12.9	13.1	5.4	--	3.4	3.5	2.5	75.2
Total hardwoods	203.8	273.8	357.6	342.2	300.5	228.8	181.9	114.6	156.2	18.7	2,178.1
Total, all species	241.7	317.6	392.4	374.8	312.8	237.1	195.8	121.5	163.0	19.9	2,376.6

[a] Includes scarlet, southern red, pin, post, and black oaks.
W-Less than 50,000 cubic feet.

Table 53.--Net volume of sawtimber on commercial forest land, by species and diameter class, South-Central Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	36.1	51.9	31.8	13.2	35.5	19.6	12.9	--	201.0
Virginia pine	34.8	12.3	3.6	--	--	--	--	--	50.7
Other yellow pines	12.8	14.1	5.0	2.5	--	--	--	--	34.4
Hemlock	5.8	28.8	5.1	17.1	21.3	7.5	17.2	5.9	108.7
Other softwoods	8.8	--	--	--	--	--	--	--	8.8
Total softwoods	98.3	107.1	45.5	32.8	56.8	27.1	30.1	5.9	403.6
White oak	--	78.1	97.1	43.1	63.4	60.8	33.4	--	375.9
Northern red oak	--	177.5	151.1	186.2	123.6	133.3	257.8	29.9	1,059.4
Other oaks[b]	--	209.8	128.8	93.8	108.5	49.9	79.0	4.4	674.2
Chestnut oak	--	258.7	297.4	201.4	162.8	70.3	87.9	4.4	1,082.9
Hickory	--	48.3	31.0	44.8	--	--	22.7	--	146.8
Yellow birch	--	0.4	W	--	--	--	0.1	--	0.5
Sweet birch	--	24.7	17.4	23.2	23.2	19.7	8.2	--	116.4
Sugar maple	--	22.4	6.8	W	--	12.6	10.1	--	51.9
Red maple	--	73.3	43.2	W	14.7	--	10.0	5.0	146.2
Beech	--	8.5	4.8	--	W	7.3	--	--	20.6
Blackgum	--	3.5	6.0	4.2	24.0	4.4	16.4	--	58.5
White ash	--	63.6	59.8	90.7	32.0	11.5	14.5	5.6	277.7
Aspen	--	0.4	--	--	--	--	--	--	0.4
Basswood	--	0.1	12.9	11.2	18.7	4.3	8.6	3.3	59.1
Yellow-poplar	--	19.6	37.7	40.5	37.6	18.7	16.5	3.9	174.5
Black walnut	--	3.3	3.9	10.6	--	--	--	--	17.8
Black cherry	--	10.7	W	0.2	--	5.0	6.5	--	22.4
Black locust	--	16.2	15.6	17.8	8.3	--	5.6	--	63.5
Other hardwoods	--	33.4	35.2	15.9	--	10.4	11.7	9.1	115.7
Total hardwoods	--	1,052.5	948.7	783.6	616.8	408.2	589.0	65.6	4,464.4
Total, all species	98.3	1,159.6	994.2	816.4	673.6	435.3	619.1	71.5	4,868.0

[a] International 1/4-inch rule.

[b] Includes scarlet, pin, and black oaks.

W-Less than 50,000 board feet.

Table 54.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, South-Central Unit, Pennsylvania, 1978.
(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	18.1	29.5	89.9	63.5	201.0
Yellow pines	4.7	8.3	72.1	--	85.1
Other softwoods[c]	--	--	--	--	117.5
Total softwoods	22.8	37.8	162.0	63.5	403.6
White oak	57.7	71.5	159.5	87.2	375.9
Northern red oak	330.8	230.7	393.0	104.9	1,059.4
Other oaks[d]	90.8	120.1	288.4	174.9	674.2
Chestnut oak	144.0	249.9	513.3	175.7	1,082.9
Hickory	12.2	19.2	74.6	40.8	146.8
Yellow birch	--	--	0.2	0.3	0.5
Sweet birch	15.6	22.9	60.9	17.0	116.4
Sugar maple	9.8	8.1	23.7	10.3	51.9
Red maple	3.1	10.4	95.9	36.8	146.2
Beech	0.4	3.1	15.0	2.1	20.6
Blackgum	18.1	11.0	17.6	11.8	58.5
White ash	58.9	79.0	103.9	35.9	277.7
Aspen	--	--	W	0.4	0.4
Basswood	13.3	20.0	22.6	3.2	59.1
Yellow-poplar	43.0	35.8	72.7	23.0	174.5
Black walnut	6.2	7.0	3.8	0.8	17.8
Black cherry	0.1	1.6	15.1	5.6	22.4
Black locust	--	8.7	44.9	9.9	63.5
Other hardwoods	3.3	28.3	56.3	27.8	115.7
Total hardwoods	807.3	927.3	1,961.4	768.4	4,464.4
Hardwood quality (in percent)	18	21	44	17	100
Hardwood sampling error (in percent)	8	5	5	6	3.2

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes scarlet, pin, and black oaks.

W-Less than 50,000 board feet.

Table 55.--Sampling errors for major number of trees and timber-volume classes, South-Central Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 51)	Growing-stock volume (Table 52)	Sawtimber volume (Table 53)
White and red pines	28	24	21
Virginia pine	38	46	47
Other yellow pines	31	33	37
Hemlock	31	20	27
Other softwoods	98	98	100
Select white oaks	17	14	17
Northern red oak	10	9	9
Other oaks	12	11	12
Chestnut oak	10	9	10
Hickory	23	24	28
Yellow birch	29	31	44
Sweet birch	19	16	24
Sugar maple	33	32	41
Red maples	13	12	19
Beech	53	42	54
Blackgum	27	19	26
White ash	24	20	23
Aspen	35	37	48
Basswood	48	53	62
Yellow-poplar	39	36	36
Black walnut	47	44	46
Black cherry	38	31	39
Black locust	35	34	41
Other hardwoods	32	24	32
Dbh classes (inches)			
5.0 to 6.9	8	8	--
7.0 to 8.9	6	7	--
9.0 to 10.9	6	6	26
11.0 to 12.9	7	6	7
13.0 to 14.9	8	7	7
15.0 to 16.9	11	9	8
17.0 to 18.9	13	11	9
19.0 to 20.9	15	12	10
21.0 to 28.9	16	15	13
29.0 +	45	41	39

Table 56.--Number of growing-stock trees on commercial forest land, by species and diameter class, Northeastern Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	4,857	2,415	1,856	1,044	538	348	154	96	120	19	11,447
Other yellow pines	W	2	1	1	W	W	--	--	--	--	4
Hemlock	5,005	2,720	2,634	2,088	1,018	588	138	46	70	--	14,307
Other softwoods	2	1	--	--	--	--	--	--	--	--	3
Total softwoods	9,864	5,138	4,491	3,133	1,556	936	292	142	190	19	25,761
White oak	1,653	2,291	864	889	89	58	28	75	28	--	5,975
Northern red oak	3,321	3,905	3,278	1,702	1,001	530	121	188	204	7	14,257
Other oaks[a]	922	260	538	118	201	74	21	W	1	--	2,135
Chestnut oak	2,221	2,647	2,494	789	164	95	47	20	1	--	8,478
Hickory	1,227	1,365	393	67	115	59	--	61	--	--	3,287
Yellow birch	2,076	722	388	310	104	33	--	--	W	--	3,633
Sweet birch	3,543	3,586	1,657	512	243	159	W	--	--	--	9,700
Sugar maple	9,708	6,510	3,837	2,337	1,072	464	220	58	55	17	24,278
Red maple	21,063	12,989	7,670	3,463	1,299	474	163	18	96	8	47,243
Beech	5,994	1,813	2,101	1,212	803	412	242	34	28	--	12,639
White ash	4,398	2,264	1,484	759	222	123	22	36	15	--	9,323
Aspen	4,107	1,447	1,626	600	236	--	--	--	--	--	8,016
Basswood	1,487	1,576	1,126	630	192	32	25	19	30	--	5,117
Yellow-poplar	--	138	--	--	--	--	--	--	--	--	138
Black walnut	--	--	--	--	--	37	--	18	--	--	55
Black cherry	1,529	2,295	1,629	975	541	210	200	71	44	--	7,494
Other hardwoods	574	513	240	65	34	--	54	--	94	12	1,586
Total hardwoods	63,823	44,321	29,325	14,428	6,316	2,760	1,143	598	596	44	163,354
Total, all species	73,687	49,459	33,816	17,561	7,872	3,696	1,435	740	786	63	189,115

[a] Includes scarlet and black oaks.

W-Less than 500 trees.

Table 57.--Net volume of growing stock on commercial forest land, by species and diameter class, Northeastern Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	26.6	20.6	20.6	16.2	12.9	9.9	5.8	4.9	8.4	1.7	127.6
Other yellow pines	W	W	W	W	W	W	--	--	--	--	W
Hemlock	19.9	16.7	27.0	31.6	22.4	17.8	5.9	2.7	5.3	--	149.3
Other softwoods	W	W	--	--	--	--	--	--	--	--	W
Total softwoods	46.5	37.3	47.6	47.8	35.3	27.7	11.7	7.6	13.7	1.7	276.9
White oak	5.6	13.1	8.6	14.6	1.8	2.0	1.2	4.2	2.3	--	53.4
Northern red oak	12.6	27.7	37.1	28.9	23.9	17.0	4.8	9.3	13.3	0.9	175.5
Other oaks[a]	3.6	1.8	6.1	1.8	4.7	2.3	1.0	W	W	--	21.3
Chestnut oak	6.9	15.9	25.1	11.5	3.5	2.5	1.5	0.8	W	--	67.7
Hickory	4.4	10.0	4.1	1.0	2.8	1.9	--	2.6	--	--	26.8
Yellow birch	6.8	4.8	4.4	5.2	2.5	0.8	--	--	W	--	24.5
Sweet birch	12.2	20.5	17.7	8.0	5.3	4.4	W	--	--	--	68.1
Sugar maple	44.6	52.8	48.7	45.6	28.9	18.6	10.6	3.4	4.3	2.1	259.6
Red maple	76.1	93.9	94.2	63.2	35.0	17.1	7.2	0.8	5.2	0.6	393.3
Beech	25.2	13.1	24.8	22.8	22.4	14.1	11.5	2.1	2.0	--	138.0
White ash	16.0	16.2	17.6	15.2	6.4	4.6	1.2	1.8	1.0	--	80.0
Aspen	12.0	9.3	17.6	10.3	5.7	--	--	--	--	--	54.9
Basswood	6.0	11.5	14.4	13.1	5.9	1.1	1.2	1.2	2.3	--	56.7
Yellow-poplar	--	0.8	--	--	--	--	--	--	--	--	0.8
Black walnut	--	--	--	--	--	0.9	--	1.1	--	--	2.0
Black cherry	6.5	17.5	21.9	21.2	16.3	8.8	11.6	5.0	3.4	--	112.2
Other hardwoods	1.9	3.0	1.9	0.8	0.7	--	1.8	--	7.6	2.2	19.9
Total hardwoods	240.4	311.9	344.2	263.2	165.8	96.1	53.6	32.3	41.4	5.8	1,554.7
Total, all species	286.9	349.2	391.8	311.0	201.1	123.8	65.3	39.9	55.1	7.5	1,831.6

[a] Includes scarlet and black oaks.

W-Less than 50,000 cubic feet.

Table 58 .--Net volume of sawtimber on commercial forest land, by species and diameter class, Northeastern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	62.7	59.0	53.1	41.1	25.8	20.6	41.5	7.2	311.0
Other yellow pines	W	0.1	W	W	--	--	--	--	0.1
Hemlock	83.7	117.4	93.1	78.4	27.1	12.8	26.4	--	438.9
Total softwoods	146.4	176.5	146.2	119.5	52.9	33.4	67.9	7.2	750.0
White oak	--	48.5	5.8	7.3	5.5	17.4	9.0	--	93.5
Northern red oak	--	97.8	91.9	68.1	21.0	39.9	58.0	2.8	379.5
Other oaks[b]	--	6.3	18.1	10.1	3.8	W	0.2	--	38.5
Chestnut oak	--	38.9	14.0	9.6	6.7	2.9	0.1	--	72.2
Hickory	--	3.0	9.8	8.0	--	10.4	--	--	31.2
Yellow birch	--	17.9	9.7	3.0	--	--	W	--	30.6
Sweet birch	--	25.5	19.3	16.8	W	--	--	--	61.6
Sugar maple	--	148.6	104.0	73.9	42.8	13.0	17.4	10.1	409.8
Red maple	--	209.6	132.4	69.8	29.4	3.2	20.9	2.9	468.2
Beech	--	74.0	80.2	51.4	45.2	7.5	8.1	--	266.4
White ash	--	51.3	23.0	17.7	5.6	6.4	4.4	--	108.4
Aspen	--	35.8	22.0	--	--	--	--	--	57.8
Basswood	--	45.2	21.3	3.8	4.7	4.2	9.0	--	88.2
Black walnut	--	--	--	3.0	--	4.4	--	--	7.4
Black cherry	--	70.2	60.3	35.6	50.3	21.0	14.9	--	252.3
Other hardwoods	--	2.7	2.4	--	6.7	--	31.2	9.1	52.1
Total hardwoods	--	875.3	614.2	378.1	221.7	130.3	173.2	24.9	2,417.7
Total, all species	146.4	1,051.8	760.4	497.6	274.6	163.7	241.1	32.1	3,167.7

[a] International 1/4-inch rule.

[b] Includes scarlet and black oaks.

W-Less than 50,000 board feet.

Table 59.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Northeastern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	1.5	19.0	145.9	144.6	311.0
Yellow pines	W	W	0.1	--	0.1
Other softwoods[c]	--	--	--	--	438.9
Total softwoods	1.5	19.0	146.0	144.6	750.0
White oak	9.6	25.3	42.7	15.9	93.5
Northern red oak	98.5	94.1	145.7	41.2	379.5
Other oaks[d]	5.2	6.6	11.4	15.3	38.5
Chestnut oak	6.1	9.4	40.7	16.0	72.2
Hickory	4.2	7.0	11.1	8.9	31.2
Yellow birch	0.3	5.9	19.7	4.7	30.6
Sweet birch	8.0	15.0	36.4	2.2	61.6
Sugar maple	59.5	98.2	192.3	59.8	409.8
Red maple	23.6	69.0	298.6	77.0	468.2
Beech	17.3	23.8	142.6	82.7	266.4
White ash	19.3	45.2	31.2	12.7	108.4
Aspen	2.2	10.4	28.0	17.2	57.8
Basswood	6.3	14.3	59.1	8.5	88.2
Black walnut	W	3.0	4.1	0.3	7.4
Black cherry	48.1	59.3	110.3	34.6	252.3
Other hardwoods	10.6	3.7	31.4	6.4	52.1
Total hardwoods	318.8	490.2	1,205.3	403.4	2,417.7
Hardwood quality (in percent)	13	20	50	17	100
Hardwood sampling error (in percent)	13	10	7	10	6.3

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes scarlet and black oaks.

[W] Less than 50,000 board feet.

Table 60.--Sampling errors for major number of trees and timber-volume classes, Northeastern Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 56)	Growing-stock volume (Table 57)	Sawtimber volume (Table 58)
White and red pines	39	31	29
Other yellow pines	45	41	48
Hemlock	23	22	23
Other softwoods	79	91	--
Select white oaks	41	36	33
Northern red oak	21	20	23
Other oaks	52	47	45
Chestnut oak	31	32	39
Hickory	32	30	47
Yellow birch	28	30	40
Sweet birch	18	19	32
Sugar maple	17	16	23
Red maples	14	12	18
Beech	17	15	18
Blackgum	35	41	102
White ash	23	18	21
Aspen	24	22	28
Basswood	40	30	30
Yellow-poplar	100	100	107
Black walnut	74	73	68
Black cherry	25	24	30
Black locust	--	--	--
Other hardwoods	41	55	75
Dbh classes (inches)			
5.0 to 6.9	8	9	--
7.0 to 8.9	8	7	--
9.0 to 10.9	8	6	28
11.0 to 12.9	9	6	7
13.0 to 14.9	12	10	9
15.0 to 16.9	14	13	10
17.0 to 18.9	16	16	14
19.0 to 20.9	23	22	20
21.0 to 28.9	21	21	20
29.0 +	44	45	43

Table 61.--Number of growing-stock trees on commercial forest land, by species and diameter class, Pocono Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	938	1,100	648	777	143	246	133	51	119	19	4,174
Virginia pine	1,345	814	724	228	W	--	--	--	--	--	3,111
Other yellow pines	3,600	784	894	720	123	61	49	--	--	--	6,231
Hemlock	3,910	2,340	1,180	1,384	465	288	142	76	87	--	9,872
Other softwoods	242	--	--	50	--	--	24	--	16	--	332
Total softwoods	10,035	5,038	3,446	3,159	731	595	348	127	222	19	23,720
Select white oaks[a]	9,138	7,187	4,010	1,995	976	798	293	2	182	--	24,581
Northern red oak	5,130	4,586	3,160	1,713	1,019	628	361	234	182	7	17,020
Other oaks[b]	2,949	3,326	3,292	1,734	881	303	180	134	70	--	12,869
Chestnut oak	20,197	16,426	8,097	3,737	1,711	637	340	162	97	--	51,404
Hickory	872	174	577	80	--	31	49	--	--	--	1,783
Yellow birch	1,717	2,037	367	112	38	--	--	--	W	--	4,271
Sweet birch	5,206	2,860	1,198	427	351	62	26	--	--	--	10,130
Sugar maple	2,945	1,773	662	363	400	151	97	102	13	--	6,506
Red maple	27,972	9,401	4,169	1,586	578	136	149	20	17	--	44,028
Beech	850	1,713	788	652	198	34	79	22	--	--	4,336
Blackgum	3,106	547	320	217	--	94	1	21	10	--	4,316
White ash	2,238	1,139	700	374	209	81	21	22	W	--	4,784
Aspen	1,110	1,402	850	416	--	--	--	--	--	--	3,778
Basswood	177	232	314	W	43	--	--	19	--	--	785
Yellow-poplar	1,010	258	594	271	126	95	146	W	45	--	2,545
Black walnut	228	--	--	--	--	13	--	--	--	--	241
Black cherry	3,238	1,045	709	278	268	27	70	--	1	--	5,636
Black locust	653	409	2	56	82	--	--	--	--	--	1,202
Other hardwoods	700	152	198	273	--	--	--	--	--	--	1,323
Total hardwoods	89,436	54,667	30,007	14,284	6,880	3,090	1,812	738	617	7	201,538
Total, all species	99,471	59,705	33,453	17,443	7,611	3,685	2,160	865	839	26	225,258

[a] Includes white and swamp white oaks.

[b] Includes scarlet, pin, willow, and black oaks.

W-Less than 500 trees.

Table 62.--Net volume of growing stock on commercial forest land, by species and diameter class, Pocono Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	4.1	8.5	7.0	11.6	3.5	7.6	6.0	2.7	8.8	2.6	62.4
Virginia pine	2.7	3.3	6.1	3.0	W	--	--	--	--	--	15.1
Other yellow pines	7.8	3.7	8.4	10.3	2.8	1.8	1.9	--	--	--	36.7
Hemlock	14.9	13.5	11.4	18.7	9.4	7.6	5.8	3.9	5.6	--	90.8
Other softwoods	0.7	--	--	0.7	--	--	0.8	--	0.8	--	3.0
Total softwoods	30.2	29.0	32.9	44.3	15.7	17.0	14.5	6.6	15.2	2.6	208.0
Select white oaks[a]	29.4	43.2	38.8	31.1	22.0	24.9	12.9	0.1	13.5	--	215.9
Northern red oak	18.6	30.9	35.2	27.7	22.4	19.8	14.3	12.1	12.3	0.7	194.0
Other oaks[b]	11.5	22.7	35.4	27.5	20.4	9.2	7.3	6.6	3.7	--	144.3
Chestnut oak	64.4	91.0	73.4	49.8	32.9	15.8	11.1	6.4	5.3	--	350.1
Hickory	3.9	1.3	6.0	1.2	--	1.2	2.0	--	--	--	15.6
Yellow birch	6.3	12.4	4.1	1.6	1.0	--	--	--	W	--	25.4
Sweet birch	15.8	17.6	11.7	6.4	6.4	1.8	0.9	--	--	--	60.6
Sugar maple	10.9	14.6	8.5	7.1	10.3	4.5	4.0	5.8	0.9	--	66.6
Red maple	103.9	64.7	44.8	27.0	12.5	4.3	5.7	0.8	0.8	--	264.5
Beech	3.5	13.0	10.0	13.5	5.6	1.7	4.2	1.8	--	--	53.3
Blackgum	12.0	3.1	2.9	3.3	--	3.6	0.1	1.1	1.0	--	27.1
White ash	7.8	7.6	7.2	6.7	5.8	3.0	0.9	1.0	W	--	40.0
Aspen	3.7	10.1	10.8	7.8	--	--	--	--	--	--	32.4
Basswood	0.7	1.9	3.5	W	1.2	--	--	1.5	--	--	8.8
Yellow-poplar	5.0	1.9	7.1	5.3	3.8	3.2	6.5	W	3.1	--	35.9
Black walnut	0.6	--	--	--	--	0.4	--	--	--	--	1.0
Black cherry	10.3	6.7	8.0	4.5	7.4	1.0	3.0	--	0.1	--	41.0
Black locust	2.3	2.2	W	1.0	2.2	--	--	--	--	--	7.7
Other hardwoods	2.3	0.8	2.2	4.3	--	--	--	--	--	--	9.6
Total hardwoods	312.9	345.7	309.6	225.8	153.9	94.4	72.9	37.2	40.7	0.7	1,593.8
Total, all species	343.1	374.7	342.5	270.1	169.6	111.4	87.4	43.8	55.9	3.3	1,801.8

[a] Includes white and swamp white oaks.

[b] Includes scarlet, pin, willow, and black oaks.

W-Less than 50,000 cubic feet.

Table 63.--Net volume of sawtimber on commercial forest land, by species and diameter class, Pocono Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	20.3	39.8	14.1	30.7	25.4	10.9	39.5	11.3	192.0
Virginia pine	15.2	9.3	W	--	--	--	--	--	24.5
Other yellow pines	23.5	34.4	10.4	6.1	7.7	--	--	--	82.1
Hemlock	31.6	63.0	33.7	28.7	25.8	17.5	25.3	--	225.6
Other softwoods	--	1.9	--	--	3.3	--	3.3	--	8.5
Total softwoods	90.6	148.4	58.2	65.5	62.2	28.4	68.1	11.3	532.7
White oak	--	96.5	75.4	88.0	50.0	0.6	51.3	--	361.8
Northern red oak	--	89.2	77.1	74.8	53.7	48.7	51.7	4.2	399.4
Other oaks[b]	--	95.5	77.6	35.0	29.9	24.6	15.6	--	278.2
Chestnut oak	--	152.2	109.7	60.8	42.8	25.4	20.1	--	411.0
Hickory	--	4.5	--	4.9	7.8	--	--	--	17.2
Yellow birch	--	4.8	3.6	--	--	--	W	--	8.4
Sweet birch	--	21.3	22.7	6.3	3.0	--	--	--	53.3
Sugar maple	--	19.9	33.8	14.8	14.0	22.2	2.8	--	107.5
Red maple	--	80.4	39.6	16.1	22.7	2.9	2.8	--	164.5
Beech	--	38.9	18.3	5.7	14.7	6.5	--	--	84.1
Blackgum	--	9.6	--	12.7	0.3	4.4	2.9	--	29.9
White ash	--	20.4	20.3	11.5	3.4	3.8	W	--	59.4
Aspen	--	24.0	--	--	--	--	--	--	24.0
Basswood	--	W	3.7	--	--	6.0	--	--	9.7
Yellow-poplar	--	19.8	13.6	12.2	24.7	W	12.2	--	82.5
Black walnut	--	--	--	2.1	--	--	--	--	2.1
Black cherry	--	12.5	23.6	3.3	10.2	--	0.4	--	50.0
Black locust	--	2.7	7.6	--	--	--	--	--	10.3
Other hardwoods	--	13.2	--	--	--	--	--	--	13.2
Total hardwoods	--	705.4	526.6	348.2	277.2	145.1	159.8	4.2	2,166.5
Total, all species	90.6	853.8	584.8	413.7	339.4	173.5	227.9	15.5	2,699.2

[a] International 1/4-inch rule.
[b] Includes scarlet, willow, and black oaks.
W-Less than 50,000 board feet.

Table 64.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Pocono Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	4.6	28.6	86.3	72.5	192.0
Yellow pines	8.6	9.8	88.2	--	106.6
Other softwoods[c]	--	--	--	--	234.1
Total softwoods	13.2	38.4	174.5	72.5	532.7
White oak	58.8	92.1	136.0	74.9	361.8
Northern red oak	65.6	120.9	172.0	40.9	399.4
Other oaks[d]	25.3	52.5	131.5	68.9	278.2
Chestnut oak	31.0	96.3	220.7	63.0	411.0
Hickory	--	--	8.9	8.3	17.2
Yellow birch	0.1	0.1	4.3	3.9	8.4
Sweet birch	4.9	9.9	31.2	7.3	53.3
Sugar maple	12.9	31.8	40.7	22.1	107.5
Red maple	1.8	33.9	97.4	31.4	164.5
Beech	0.9	6.0	48.3	28.9	84.1
Blackgum	--	10.9	15.6	3.4	29.9
White ash	4.4	22.0	25.6	7.4	59.4
Aspen	--	2.1	15.2	6.7	24.0
Basswood	--	W	9.0	0.7	9.7
Yellow-poplar	25.3	13.8	33.8	9.6	82.5
Black walnut	1.2	0.9	--	--	2.1
Black cherry	8.3	10.0	24.7	7.0	50.0
Black locust	--	2.6	6.5	1.2	10.3
Other hardwoods	--	2.3	9.4	1.5	13.2
Total hardwoods	240.5	508.1	1,030.8	387.1	2,166.5
Hardwood quality (in percent)	11	23	48	18	100
Hardwood sampling error (in percent)	12	8	7	8	5.7

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[d] Includes scarlet, willow, and black oaks.

W-Less than 50,000 board feet.

Table 65.--Sampling errors for major number of trees and timber volume classes, Pocono Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 61)	Growing-stock volume (Table 62)	Sawtimber volume (Table 63)
White and red pines	27	23	22
Virginia pine	54	59	61
Other yellow pines	46	35	36
Hemlock	28	25	25
Other softwoods	71	60	75
Select white oaks	15	13	16
Northern red oak	12	10	12
Other oaks	14	15	18
Chestnut oak	11	10	14
Hickory	35	40	77
Yellow birch	45	47	59
Sweet birch	20	19	25
Sugar maple	41	36	47
Red maples	12	11	27
Beech	39	35	35
Blackgum	32	32	46
White ash	26	23	30
Aspen	26	24	41
Basswood	61	53	72
Yellow-poplar	38	38	41
Black walnut	95	71	74
Black cherry	56	40	59
Black locust	55	57	76
Other hardwoods	44	37	44
Dbh classes (inches)			
5.0 to 6.9	7	7	--
7.0 to 8.9	6	6	--
9.0 to 10.9	7	6	25
11.0 to 12.9	8	7	8
13.0 to 14.9	10	9	8
15.0 to 16.9	11	11	10
17.0 to 18.9	13	13	11
19.0 to 20.9	19	17	15
21.0 to 28.9	17	16	15
29.0 +	59	63	60

Table 66.--Number of growing-stock trees on commercial forest land, by species and diameter class, Southeastern Unit, Pennsylvania, 1978.

(In thousands of trees)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	1,136	475	516	204	106	23	56	19	13	--	2,548
Virginia pine	909	556	406	244	99	72	--	--	--	--	2,286
Other yellow pines	55	361	431	184	178	18	--	--	--	--	1,227
Hemlock	578	18	80	76	55	39	W	W	W	--	846
Other softwoods	1,360	674	86	--	--	--	--	--	--	--	2,120
Total softwoods	4,038	2,084	1,519	708	438	152	56	19	13	--	9,027
White oak	2,326	805	808	689	603	566	444	141	102	18	6,502
Northern red oak	2,742	2,492	2,493	1,719	573	474	384	172	149	12	11,210
Other oaks[a]	2,587	2,512	2,119	2,086	1,919	968	904	230	605	7	13,937
Chestnut oak	10,107	7,544	5,395	3,615	2,368	1,047	291	121	146	--	30,634
Hickory	2,575	1,647	1,865	1,285	833	259	237	95	150	--	8,946
Yellow birch	11	471	58	44	--	--	--	--	8	--	592
Sweet birch	3,023	1,625	1,377	476	156	155	23	--	78	--	6,913
Sugar maple	58	526	2	--	1	--	--	2	--	--	589
Red maples[b]	5,821	2,103	1,031	1,032	724	341	176	60	125	61	11,474
Beech	901	418	205	266	80	117	84	22	67	5	2,165
Blackgum	521	1,187	408	93	32	34	3	--	--	--	2,278
White ash	1,890	3,157	965	775	741	179	357	84	114	32	8,294
Aspen	W	296	--	W	--	--	--	--	--	--	296
Basswood	1	3	5	W	--	--	--	--	--	--	9
Yellow-poplar	1,655	1,116	1,087	1,516	740	991	280	202	380	64	8,031
Black walnut	199	99	64	58	199	97	54	--	--	--	770
Black cherry	432	693	--	64	W	95	24	22	2	--	1,332
Black locust	326	357	126	126	37	161	25	79	12	--	1,249
Other hardwoods	2,295	941	384	257	160	123	48	63	33	--	4,304
Total hardwoods	37,470	27,992	18,392	14,101	9,166	5,607	3,334	1,293	1,971	199	119,525
Total, all species	41,508	30,076	19,911	14,809	9,604	5,759	3,390	1,312	1,984	199	128,552

[a] Includes scarlet, pin, and black oaks.

[b] Includes 592,000 silver maple trees.

W-Less than 500 trees.

Table 67.--Net volume of growing stock on commercial forest land, by species and diameter class, Southeastern Unit, Pennsylvania, 1978.

(In millions of cubic feet)

Species	Diameter class (inches at breast height)										All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	4.5	3.7	5.9	3.3	2.2	0.7	2.5	1.1	1.2	--	25.1
Virginia pine	1.4	2.3	3.7	3.6	1.8	1.8	--	--	--	--	14.6
Other yellow pines	0.1	1.7	3.9	3.0	4.2	0.7	--	--	--	--	13.6
Hemlock	1.5	0.1	0.7	1.0	1.4	1.5	W	W	W	--	6.2
Other softwoods	3.3	2.4	0.6	--	--	--	--	--	--	--	6.3
Total softwoods	10.8	10.2	14.8	10.9	9.6	4.7	2.5	1.1	1.2	--	65.8
White oak	6.3	5.7	9.1	13.5	17.9	22.7	22.5	10.4	8.7	5.0	121.8
Northern red oak	8.8	15.1	26.9	29.3	15.8	16.7	17.5	9.0	12.4	1.8	153.3
Other oaks[a]	8.8	15.1	22.6	35.5	49.2	33.9	43.1	13.9	47.0	0.9	270.0
Chestnut oak	27.5	40.2	52.8	58.6	54.5	32.3	11.8	7.5	10.3	--	295.5
Hickory	8.7	9.8	22.2	25.2	23.2	10.1	11.8	6.0	12.9	--	129.9
Yellow birch	W	3.0	0.7	0.7	--	--	--	--	0.8	--	5.2
Sweet birch	9.7	9.8	13.6	7.2	3.4	5.5	0.7	--	6.9	--	56.8
Sugar maple	0.1	4.2	W	--	0.1	--	--	0.1	--	--	4.5
Red maples[b]	19.3	12.4	10.6	17.4	15.3	11.2	7.3	3.3	9.1	8.6	114.5
Beech	3.8	3.9	2.3	5.0	2.2	3.3	3.4	1.0	5.1	0.9	30.9
Blackgum	1.8	7.6	4.0	1.8	1.2	1.2	0.1	--	--	--	17.7
White ash	6.1	19.9	11.0	12.9	23.0	6.2	18.0	7.0	10.8	5.3	120.2
Aspen	W	1.4	--	W	--	--	--	--	--	--	1.4
Basswood	W	W	0.1	W	--	--	--	--	--	--	0.1
Yellow-poplar	6.2	5.9	11.9	27.0	20.9	35.3	14.0	11.6	31.8	9.0	173.6
Black walnut	0.6	0.8	0.8	0.8	4.6	4.0	2.3	--	--	--	13.9
Black cherry	1.2	3.3	--	0.8	W	2.6	0.8	0.8	0.2	--	9.7
Black locust	0.5	2.1	1.8	1.7	1.0	5.0	1.2	3.7	1.2	--	18.2
Other hardwoods	6.8	6.7	4.0	5.1	4.4	5.0	2.6	3.5	2.8	--	40.9
Total hardwoods	116.2	166.9	194.4	242.5	236.7	195.0	157.1	77.8	160.0	31.5	1,578.1
Total, all species	127.0	177.1	209.2	253.4	246.3	199.7	159.6	78.9	161.2	31.5	1,643.9

[a] Includes scarlet, pin and black oaks.

[b] Includes 11.8 million cubic feet of silver maple.

W-Less than 50,000 cubic feet.

Table 68.--Net volume of sawtimber on commercial forest land, by species and diameter class, Southeastern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Diameter class (inches at breast height)								All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+	
White and red pines	17.5	11.0	8.2	3.2	11.9	6.3	5.5	--	63.6
Virginia pine	10.2	13.0	7.0	8.0	--	--	--	--	38.2
Other yellow pines	12.2	12.0	16.9	3.6	--	--	--	--	44.7
Hemlock	2.2	3.6	4.0	5.2	W	W	W	--	15.0
Other softwoods	1.9	--	--	--	--	--	--	--	1.9
Total softwoods	44.0	39.6	36.1	20.0	11.9	6.3	5.5	--	163.4
White oak	--	38.9	57.1	76.9	80.9	37.3	33.5	17.6	342.2
Northern red oak	--	90.3	51.4	59.4	63.6	37.4	50.3	6.7	359.1
Other oaks[b]	--	106.9	161.2	118.6	155.8	50.8	178.8	3.5	775.6
Chestnut oak	--	173.0	180.2	116.1	43.4	27.4	38.1	--	578.2
Hickory	--	69.7	72.8	34.0	41.8	21.3	46.7	--	286.3
Yellow birch	--	2.0	--	--	--	--	3.4	--	5.4
Sweet birch	--	20.7	11.6	17.4	2.5	--	24.5	--	76.7
Sugar maple	--	--	0.2	--	--	0.5	--	--	0.7
Red maples[c]	--	47.9	48.4	36.7	25.0	12.6	34.3	35.0	239.9
Beech	--	12.6	6.2	10.2	10.9	3.6	19.3	3.5	66.3
Blackgum	--	4.9	3.3	4.0	0.6	--	--	--	12.8
White ash	--	35.2	68.2	21.9	62.8	22.7	40.3	19.8	270.9
Aspen	--	W	--	--	--	--	--	--	W
Basswood	--	W	--	--	--	--	--	--	W
Yellow-poplar	--	73.2	63.5	115.4	50.2	42.4	122.1	32.3	499.1
Black walnut	--	2.6	13.9	15.5	8.2	--	--	--	40.2
Black cherry	--	2.4	W	8.2	2.6	2.7	0.5	--	16.4
Black locust	--	5.1	3.5	17.8	4.7	14.8	4.9	--	50.8
Other hardwoods	--	13.9	13.8	16.9	9.5	14.8	10.9	--	79.8
Total hardwoods	--	699.3	755.3	669.0	562.5	288.3	607.6	118.4	3,700.4
Total, all species	44.0	738.9	791.4	689.0	574.4	294.6	613.1	118.4	3,863.8

[a] International 1/4-inch rule.
[b] Includes scarlet, pin, and black oaks.
[c] Includes 40.0 million board feet of silver maple.

W-Less than 50,000 board feet.

Table 69.--Net volume of sawtimber on commercial forest land, by species and standard-lumber log grade, Southeastern Unit, Pennsylvania, 1978.

(In millions of board feet)[a]

Species	Grade 1	Grade 2	Grade 3	Grade 4[b]	All classes
White and red pines	5.1	14.5	26.0	18.0	63.6
Yellow pines	5.5	5.7	71.7	--	82.9
Other softwoods[c]	--	--	--	--	16.9
Total softwoods	10.6	20.2	97.7	18.0	163.4
White oak	73.9	58.3	133.5	76.5	342.2
Northern red oak	90.5	75.0	159.1	34.5	359.1
Other oaks[d]	139.7	186.1	276.3	173.5	775.6
Chestnut oak	47.4	162.2	292.0	76.6	578.2
Hickory	12.9	46.7	155.7	71.0	286.3
Yellow birch	W	2.6	2.5	0.3	5.4
Sweet birch	13.7	21.7	34.5	6.8	76.7
Sugar maple	--	0.4	0.2	0.1	0.7
Red maples[e]	13.5	32.7	141.1	52.6	239.9
Beech	0.5	7.3	19.0	39.5	66.3
Blackgum	--	2.6	8.0	2.2	12.8
White ash	61.4	58.2	114.7	36.6	270.9
Aspen	--	--	W	W	W
Basswood	--	W	W	W	W
Yellow-poplar	137.9	103.6	181.8	75.8	499.1
Black walnut	7.2	5.9	22.6	4.5	40.2
Black cherry	3.3	3.8	6.9	2.4	16.4
Black locust	1.7	5.5	38.5	5.1	50.8
Other hardwoods	12.5	14.6	40.6	12.1	79.8
Total hardwoods	616.1	787.2	1,627.0	670.1	3,700.4
Hardwood quality (in percent)	17	21	44	18	100
Hardwood sampling error (in percent)	11	8	6	8	4.5

[a] International 1/4-inch rule.

[b] Grade 4 applies only to white pine. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

[e] Includes 40.0 million board feet of silver maple.

W-Less than 50,000 board feet.

Table 70.--Sampling errors for major number of trees and timber-volume classes, Southeastern Unit, Pennsylvania, 1978.

(In percent)

Species	Number of trees (Table 66)	Growing-stock volume (Table 67)	Sawtimber volume (Table 68)
White and red pines	39	40	46
Virginia pine	74	70	75
Other yellow pines	52	45	38
Hemlock	54	53	67
Other softwoods	89	92	102
Select white oaks	18	18	19
Northern red oak	21	19	22
Other oaks	15	15	17
Chestnut oak	18	15	17
Hickory	21	24	29
Yellow birch	78	63	92
Sweet birch	33	32	47
Sugar maple	64	72	72
Red maples	19	25	33
Beech	33	35	40
Blackgum	27	24	47
White ash	19	20	24
Aspen	97	95	106
Basswood	67	57	96
Yellow-poplar	21	17	18
Black walnut	46	42	43
Black cherry	54	42	65
Black locust	49	64	82
Other hardwoods	32	32	33
Dbh classes (inches)			
5.0 to 6.9	11	10	--
7.0 to 8.9	10	10	--
9.0 to 10.9	9	9	45
11.0 to 12.9	9	8	9
13.0 to 14.9	9	7	8
15.0 to 16.9	10	9	9
17.0 to 18.9	12	11	10
19.0 to 20.9	15	14	13
21.0 to 28.9	29	20	17
29.0 +	35	35	34

Table 71.--Land area with sampling error, by county, geographic unit, and land class, Pennsylvania, 1978.

County and geographic unit	Forest land			Nonforest land	Total land[b]	Proportion commercial[c]	Sampling error[d]
	Noncom-mercial[a]	Commercial					
		Public	Private				
	------------------Thousand acres------------------					-------Percent-------	
Allegheny	45.8	1.1	128.3	290.7	465.9	28	11
Armstrong	.5	5.9	213.9	197.0	417.3	53	6
Beaver	8.9	4.0	135.0	133.7	281.6	49	10
Butler	13.1	7.9	235.6	251.6	508.2	48	6
Crawford	19.8	18.0	304.3	305.6	647.7	50	9
Erie	3.2	9.0	203.1	305.0	520.3	41	6
Greene	1.3	8.7	205.5	154.4	369.9	58	6
Indiana	4.6	12.7	287.3	223.4	528.0	57	4
Lawrence	3.6	1.7	76.0	153.6	234.9	33	21
Mercer	7.2	5.5	162.6	253.5	428.8	39	15
Washington	4.1	6.0	203.5	334.9	548.5	38	9
Westmoreland	8.0	28.3	270.4	348.6	655.3	46	5
Western Unit	120.1	108.8	2,425.5	2,952.0	5,606.4	45	2.3
Bedford	15.0	73.0	348.7	214.8	651.5	65	2
Blair	11.6	51.9	157.7	118.0	339.2	62	3
Cambria	20.3	46.7	208.7	167.2	442.9	58	4
Fayette	30.9	34.5	269.7	178.2	513.3	59	6
Somerset	23.8	61.7	344.5	259.9	689.9	59	3
Southwestern Unit	101.6	267.8	1,329.3	938.1	2,636.8	61	1.8
Cameron	10.2	138.3	102.3	5.8	256.6	94	1
Elk	10.6	244.0	218.3	43.6	516.5	90	1
Forest	3.0	122.4	125.0	17.8	268.2	92	1
McKean	8.1	161.2	390.3	75.3	634.9	87	1
Potter	5.3	278.7	316.8	98.1	698.9	85	2
Sullivan	2.8	89.3	162.1	51.7	305.9	82	2
Tioga	15.0	159.1	314.5	244.8	733.4	65	3
Warren	1.7	171.1	288.8	117.6	579.2	79	3
Allegheny Unit	56.7	1,364.1	1,918.1	654.7	3,993.6	82	1.0

Table 71.--Continued

County and geographic unit	Forest land			Nonforest land	Total land^b	Proportion commercial^c	Sampling error^d
	Noncom-mercial^a	Commercial					
		Public	Private				
	Thousand acres					Percent	
Centre	42.6	178.5	325.0	167.5	713.6	71	2
Clarion	5.0	13.7	203.6	159.8	382.1	57	2
Clearfield	9.8	113.6	455.5	150.0	728.9	78	3
Clinton	83.6	199.0	230.0	62.8	575.4	75	1
Jefferson	1.5	43.4	230.4	142.0	417.3	66	2
Lycoming	44.1	203.8	350.2	179.5	777.6	71	2
Venango	9.8	19.9	293.2	111.0	433.9	72	4
North-Central Unit	196.4	771.9	2,087.9	972.6	4,028.8	71	1.0
Dauphin	10.2	58.6	91.2	171.5	331.5	45	3
Franklin	7.9	62.4	137.2	275.1	482.6	41	4
Fulton	3.2	44.5	134.1	96.6	278.4	64	2
Huntingdon	39.5	84.5	300.5	148.3	572.8	67	3
Juniata	8.0	20.9	132.5	85.7	247.1	62	4
Mifflin	17.6	48.2	114.9	95.1	275.8	59	2
Perry	13.0	46.5	164.2	128.9	352.6	60	2
Snyder	5.4	25.3	67.1	111.5	209.3	44	4
Union	27.7	53.9	55.5	66.4	203.5	54	2
South-Central Unit	132.5	444.8	1,197.2	1,179.1	2,953.6	56	1.0
Bradford	1.3	47.0	333.8	352.6	734.7	52	5
Lackawanna	9.5	17.7	170.2	93.2	290.6	65	4
Susquehanna	1.2	12.6	307.4	211.9	533.1	60	3
Wayne	3.3	14.4	292.8	163.8	474.3	65	4
Wyoming	1.0	27.6	133.8	92.3	254.7	63	5
Northeastern Unit	16.3	119.3	1,238.0	913.8	2,287.4	59	2.1
Carbon	27.9	43.7	117.2	69.7	258.5	62	4
Columbia	2.5	16.4	123.0	167.9	309.8	45	5
Luzerne	27.7	37.2	326.3	175.8	567.0	64	3
Monroe	18.1	42.6	241.2	89.1	391.0	73	1
Montour	0.3	0.4	23.2	59.3	83.2	28	18

Northumberland	0.1	9.6	103.4	176.8	289.9	39	6
Pike	26.8	70.9	202.1	47.1	346.9	79	1
Schuylkill	48.7	38.3	261.2	153.6	501.8	60	2
Pocono Unit	152.1	259.1	1,397.6	939.3	2,748.1	60	1.0
Adams	3.1	20.1	83.7	229.7	336.6	31	6
Berks	17.5	22.1	129.5	382.6	551.7	27	6
Bucks	23.3	4.1	75.6	290.0	393.0	20	11
Chester	13.7	3.6	84.0	385.8	487.1	18	14
Cumberland	6.1	35.4	74.2	239.5	355.2	31	10
Delaware	17.9	--	--	99.9	117.8	0	--
Lancaster	2.4	8.2	87.9	506.9	605.4	16	7
Lebanon	9.8	23.6	26.6	172.3	232.3	22	16
Lehigh	1.5	3.5	49.3	168.4	222.7	24	9
Montgomery	6.5	0.6	64.9	245.4	317.4	21	18
Northampton	2.6	10.8	45.2	182.0	240.6	23	7
Philadelphia	5.1	--	--	76.8	81.9	0	--
York	17.0	3.1	138.3	423.4	581.8	24	6
Southeastern Unit	126.5	135.1	859.2	3,402.7	4,523.5	22	2.8
All counties	902.2	3,470.9	12,452.8	11,952.3	28,778.2	55	.6

[a] Includes productive-reserved, urban and unproductive forest land.

[b] Source: U.S. Dep. Commer., Bur. Census. 1973. Census of Population, 1970 Vol. I.

[c] Percentage of total land area that is in commercial forest.

[d] For commercial forest land.

Table 72.--Area of commercial forest land, by county, geographic unit, and stand-size class, Pennsylvania, 1978.

(In thousands of acres)

County[a] and geographic unit	Sawtimber stands	Poletimber stands	Other stands	All classes
Allegheny	53.2	--	76.2	129.4
Armstrong	78.5	58.3	83.0	219.8
Beaver/Lawrence/Mercer	152.1	90.3	142.4	384.8
Butler	108.2	64.3	71.0	243.5
Crawford	120.9	67.8	133.6	322.3
Erie	86.7	37.3	88.1	212.1
Greene/Washington	121.9	162.9	138.9	423.7
Indiana	156.2	72.4	71.4	300.0
Westmoreland	163.3	94.0	41.4	298.7
Western Unit	1,041.0	647.3	846.0	2,534.3
Bedford	190.7	134.6	96.4	421.7
Blair	107.8	80.1	21.7	209.6
Cambria	179.2	21.6	54.6	255.4
Fayette	128.6	112.2	63.4	304.2
Somerset	147.6	145.4	113.2	406.2
Southwestern Unit	753.9	493.9	349.3	1,597.1
Cameron/Potter	417.4	382.3	36.4	836.1
Elk	229.4	170.9	62.0	462.3
Forest	150.4	90.4	6.6	247.4
McKean	327.0	180.5	44.0	551.5
Sullivan	164.7	62.0	24.7	251.4
Tioga	222.0	195.8	55.8	473.6
Warren	274.2	132.3	53.4	459.9
Allegheny Unit	1,785.1	1,214.2	282.9	3,282.2
Centre	283.5	151.5	68.5	503.5
Clarion	100.0	43.8	73.5	217.3
Clearfield	205.1	175.4	188.6	569.1
Clinton	214.0	182.8	32.2	429.0
Jefferson	204.0	36.1	33.7	273.8
Lycoming	362.0	141.5	50.5	554.0
Venango	165.2	79.9	68.0	313.1
North-Central Unit	1,533.8	811.0	515.0	2,859.8
Dauphin	39.8	66.0	44.0	149.8
Franklin	117.2	50.0	32.4	199.6
Fulton	103.0	14.7	60.9	178.6
Huntingdon	167.4	124.6	93.0	385.0
Juniata/Mifflin	156.2	141.1	19.2	316.5
Perry	145.9	47.7	17.1	210.7
Snyder/Union	83.3	60.8	57.7	201.8
South-Central Unit	812.8	504.9	324.3	1,642.0
Bradford	111.9	155.4	113.5	380.8
Lackawanna	60.8	42.4	84.7	187.9
Susquehanna	87.8	135.8	96.4	320.0
Wayne	150.1	129.4	27.7	307.2
Wyoming	60.6	87.8	13.0	161.4
Northeastern Unit	471.2	550.8	335.3	1,357.3
Carbon	26.4	66.4	68.1	160.9
Columbia/Montour/Northumberland	114.0	107.0	55.0	276.0
Luzerne	95.2	128.1	140.2	363.5
Monroe	121.8	95.3	66.7	283.8
Pike	156.1	98.3	18.6	273.0
Schuylkill	23.7	153.3	122.5	299.5
Pocono Unit	537.2	648.4	471.1	1,656.7
Adams/Cumberland/York	276.6	55.6	22.6	354.8
Berks	109.0	21.6	21.0	151.6
Bucks/Lehigh/Northampton	103.5	21.4	63.6	188.5
Chester/Montgomery	97.2	17.8	38.1	153.1
Lancaster/Lebanon	104.2	21.2	20.9	146.3
Southeastern Unit	690.5	137.6	166.2	994.3
All counties	7,625.5	5,008.1	3,290.1	15,923.7

[a] Multi-county groupings are used for counties with too few forested field sample plots or with other sampling anomalies. This is done when more detailed county-level data are presented in order to minimize sampling errors.

Table 73.--Area of commercial forest land, by county, geographic unit, and major forest-type group, Pennsylvania, 1978,

(In thousands of acres)

County[a] and geographic unit	Softwood types[b]	Oak types[c]	Northern hardwood types[d]	All types
Allegheny	12.4	51.6	65.4	129.4
Armstrong	13.9	119.9	86.0	219.8
Beaver/Lawrence/Mercer	--	211.4	173.4	384.8
Butler	11.4	70.5	161.6	243.5
Crawford	6.9	55.0	260.4	322.3
Erie	13.6	--	198.5	212.1
Greene/Washington	17.9	212.1	193.7	423.7
Indiana	36.2	131.9	131.9	300.0
Westmoreland	12.1	140.6	146.0	298.7
Western Unit	124.4	993.0	1,416.9	2,534.3
Bedford	3.1	341.5	77.1	421.7
Blair	23.3	119.0	67.3	209.6
Cambria	10.6	113.9	130.9	255.4
Fayette	.4	152.8	151.0	304.2
Somerset	.1	205.5	200.6	406.2
Southwestern Unit	37.5	932.7	626.9	1,597.1
Cameron/Potter	3.3	175.1	657.6	836.0
Elk	18.6	113.6	330.3	462.5
Forest	16.6	101.8	129.0	247.4
McKean	12.8	65.8	472.9	551.5
Sullivan	11.9	1.5	237.9	251.3
Tioga	34.6	124.8	314.2	473.6
Warren	3.8	107.5	348.6	459.9
Allegheny Unit	101.6	690.1	2,490.5	3,282.2
Centre	15.0	409.6	78.9	503.5
Clarion	64.6	88.2	64.5	217.3
Clearfield	47.1	242.7	279.3	569.1
Clinton	64.2	313.6	51.2	429.0
Jefferson	40.9	79.6	153.3	273.8
Lycoming	25.9	265.9	262.2	554.0
Venango	9.6	176.6	126.9	313.1
North-Central Unit	267.3	1,576.2	1,016.3	2,859.8
Dauphin	13.1	107.3	29.4	149.8
Franklin	16.3	149.6	33.7	199.6
Fulton	10.6	139.8	28.2	178.6
Huntingdon	29.5	287.1	68.4	385.0
Juniata/Mifflin	1.0	274.4	41.1	316.5
Perry	16.4	177.8	16.5	210.7
Snyder/Union	26.9	132.8	42.1	201.8
South-Central Unit	113.8	1,268.8	259.4	1,642.0
Bradford	31.0	104.8	245.0	380.8
Lackawanna	9.2	60.1	118.6	187.9
Susquehanna	32.7	10.5	276.8	320.0
Wayne	33.4	43.6	230.2	307.2
Wyoming	--	74.8	86.6	161.4
Northeastern Unit	106.3	293.8	957.2	1,357.3
Carbon	--	93.0	67.9	160.9
Columbia/Montour/ Northumberland	10.6	234.0	31.4	276.0
Luzerne	31.7	223.9	107.9	363.5
Monroe	20.8	168.0	95.0	283.8
Pike	9.1	248.4	15.5	273.0
Schuylkill	10.5	210.7	78.3	299.5
Pocono Unit	82.7	1,178.0	396.0	1,656.7
Adams/Cumberland/ York	22.5	287.7	44.6	354.8
Berks	--	120.1	31.5	151.6
Bucks/Lehigh/ Northampton	--	85.0	103.5	188.5
Chester/Montgomery	6.5	124.8	21.8	153.1
Lancaster/Lebanon	--	103.0	43.3	146.3
Southeastern Unit	29.0	720.6	244.7	994.3
All counties	862.6	7,653.2	7,407.9	15,923.7

[a] Multi-county groupings are used for counties with too few forested field sample plots or with other sampling anomalies. This is done when more detailed county-level data are presented in order to minimize sampling errors.

[b] Includes white pine and hemlock group, spruce fir group, and Scotch and Virginia pine group.

[c] Includes oak/pine group, oak/hickory group, and oak/gum group.

[d] Includes elm/ash/red maple group, northern hardwoods group, and aspen/birch group.

Table 74.--Net volume of growing stock on commercial forest land, by county, geographic unit, and major species group, Pennsylvania, 1978.

(In million cubic feet)

County[a] and geographic unit	Oaks	Maples	Other	Total	Sampling error[b]
Allegheny	28.8	1.6	65.9	96.3	13
Armstrong	68.4	29.0	103.0	200.4	8
Beaver/Lawrence/Mercer	135.0	59.9	116.4	311.3	8
Butler	62.7	50.6	106.6	219.9	9
Crawford	17.7	89.9	176.6	284.2	8
Erie	--	82.6	115.3	197.9	10
Greene/Washington	35.0	33.5	198.8	267.3	10
Indiana	71.8	73.6	136.9	282.3	8
Westmoreland	109.7	60.2	168.3	338.2	7
Western Unit	529.1	480.9	1,187.8	2,197.8	2.9
Bedford	316.8	98.1	126.6	541.5	6
Blair	170.5	45.1	56.0	271.6	7
Cambria	100.3	68.9	163.1	332.3	7
Fayette	122.9	52.1	117.1	292.1	9
Somerset	195.2	119.1	174.8	489.1	6
Southwestern Unit	905.7	383.3	637.6	1,926.6	3.0
Cameron/Potter	248.0	520.0	670.4	1,438.4	2
Elk	116.7	398.2	395.5	910.4	4
Forest	121.2	178.2	251.7	551.1	5
McKean	82.1	500.2	506.2	1,088.5	8
Sullivan	6.4	227.0	264.7	498.1	5
Tioga	153.2	275.7	384.8	813.7	4
Warren	137.3	332.7	484.2	954.2	4
Allegheny Unit	864.9	2,432.0	2,957.5	6,254.4	1.3
Centre	411.3	89.8	141.2	642.3	4
Clarion	115.7	52.0	87.8	255.5	9
Clearfield	226.4	150.9	272.8	650.1	5
Clinton	319.4	66.5	172.7	558.6	4
Jefferson	75.4	108.5	212.3	396.2	6
Lycoming	255.9	212.1	356.5	824.5	4
Venango	186.7	99.2	110.3	396.2	6
North-Central Unit	1,590.8	779.0	1,353.6	3,723.4	1.9
Dauphin	144.4	15.1	62.5	222.0	7
Franklin	219.7	9.6	64.7	294.0	6
Fulton	140.7	32.0	102.2	274.9	5
Huntingdon	257.3	57.0	230.8	545.1	4
Juniata/Mifflin	285.7	31.9	120.0	437.6	4
Perry	190.1	16.9	100.4	307.4	5
Snyder/Union	150.3	19.7	125.6	295.6	5
South-Central Unit	1,388.2	182.2	806.2	2,376.6	1.9
Bradford	99.3	194.4	246.2	539.9	5
Lackawanna	48.1	39.9	127.0	215.0	8
Susquehanna	23.4	185.8	226.1	435.3	5
Wayne	70.5	162.5	182.6	415.6	6
Wyoming	76.6	70.3	78.9	225.8	7
Northeastern Unit	317.9	652.9	860.8	1,831.6	2.6
Carbon	36.2	43.6	68.3	148.1	10
Columbia/Montour/ Northumberland	224.2	41.6	86.5	352.3	6
Luzerne	155.5	61.5	140.2	357.2	6
Monroe	105.8	95.5	121.0	322.3	6
Pike	211.0	56.3	75.9	343.2	4
Schuylkill	171.6	32.6	74.5	278.7	7
Pocono Unit	904.3	331.1	566.4	1,801.8	2.6
Adams/Cumberland/York	393.4	26.0	175.4	594.8	5
Berks	98.1	28.2	111.2	237.5	10
Bucks/Lehigh/ Northampton	101.9	18.7	172.7	293.3	9
Chester/Montgomery	131.9	11.4	125.8	269.1	8
Lancaster/Lebanon	115.3	34.7	99.2	249.2	9
Southeastern Unit	840.6	119.0	684.3	1,643.9	3.4
All counties	7,341.5	5,360.4	9,054.2	21,756.1	0.8

[a] Multi-county groupings are used for counties with too few forested field sample plots or with other sampling anomalies. This is done when more detailed county-level data are presented in order to minimize sampling errors.

[b] Sampling error of total.

Table 75.--Net volume of sawtimber on commercial forest land, by county, geographic unit, and major species group, Pennsylvania, 1978.

(In million board feet)

County[a] and geographic unit	Oaks	Maples	Other	Total	Sampling error[b]
Allegheny	99.1	6.9	149.7	255.7	16
Armstrong	230.5	51.2	200.3	482.0	12
Beaver/Lawrence/Mercer	488.1	128.9	260.4	877.4	8
Butler	192.7	131.2	249.7	573.6	12
Crawford	62.0	253.0	403.1	718.1	10
Erie	--	279.1	241.2	520.3	12
Greene/Washington	174.6	45.5	499.7	719.8	11
Indiana	258.1	183.1	275.6	716.8	10
Westmoreland	232.4	153.7	501.4	887.5	10
Western Unit	1,737.5	1,232.6	2,781.1	5,751.2	3.6
Bedford	890.5	230.1	345.3	1,465.9	7
Blair	409.2	67.2	112.3	588.7	12
Cambria	353.2	116.7	445.2	915.1	9
Fayette	249.8	117.1	286.8	653.7	21
Somerset	542.4	269.4	338.9	1,150.7	9
Southwestern Unit	2,445.1	800.5	1,528.5	4,774.1	4.2
Cameron/Potter	703.0	840.8	1,391.3	2,935.1	4
Elk	298.7	622.2	887.3	1,808.2	6
Forest	358.6	246.7	516.9	1,122.2	7
McKean	271.5	731.5	1,208.1	2,211.1	6
Sullivan	24.4	442.8	655.5	1,122.7	6
Tioga	514.1	459.3	771.8	1,745.2	5
Warren	469.3	539.1	1,077.6	2,086.0	5
Allegheny Unit	2,639.6	3,882.4	6,508.5	13,030.5	2.0
Centre	952.4	97.0	301.7	1,351.1	7
Clarion	374.0	109.1	174.7	657.8	11
Clearfield	579.7	240.3	577.4	1,397.4	7
Clinton	738.9	20.6	425.6	1,185.1	7
Jefferson	252.3	171.9	509.8	934.0	8
Lycoming	706.5	320.6	739.6	1,766.7	5
Venango	553.7	215.2	210.3	979.2	7
North-Central Unit	4,157.5	1,174.7	2,939.1	8,271.3	2.6
Dauphin	277.9	21.9	140.7	440.5	9
Franklin	524.8	7.4	93.7	625.9	7
Fulton	335.3	35.5	233.8	604.6	8
Huntington	644.4	48.9	455.6	1,148.9	6
Juniata/Mifflin	632.3	45.0	221.7	899.0	6
Perry	452.9	15.7	159.4	628.0	7
Snyder/Union	324.8	23.7	172.6	521.1	8
South-Central Unit	3,192.4	198.1	1,477.5	4,868.0	2.7
Bradford	181.2	250.6	504.8	936.6	6
Lackawanna	86.4	33.3	263.9	383.6	10
Susquehanna	36.5	283.1	458.9	778.5	7
Wayne	121.4	225.4	358.5	705.3	8
Wyoming	158.2	85.6	119.9	363.7	10
Northeastern Unit	583.7	878.0	1,706.0	3,167.7	3.4
Carbon	59.7	13.0	114.7	187.4	18
Columbia/Montour/ Northumberland	347.7	49.0	132.5	529.2	12
Luzerne	239.2	46.8	268.3	554.3	11
Monroe	203.6	112.1	221.5	537.2	10
Pike	379.1	34.4	154.5	568.0	7
Schuylkill	221.1	16.7	85.3	323.1	13
Pocono Unit	1,450.4	272.0	976.8	2,699.2	4.5
Adams/Cumberland/York	932.3	55.8	407.0	1,395.1	9
Berks	257.7	59.0	248.6	565.3	14
Bucks/Lehigh/ Northampton	267.0	13.5	366.8	647.3	10
Chester/Montgomery	352.2	23.9	308.0	684.1	9
Lancaster/Lebanon	245.9	88.4	237.7	572.0	11
Southeastern Unit	2,055.1	240.6	1,568.1	3,863.8	4.2
All counties	18,261.3	8,678.9	19,485.6	46,425.8	1.1

[a] Multi-county groupings are used for counties with too few forested field sample plots or with other sampling anomalies. This is done when more detailed county-level data are presented in order to minimize sampling errors.

[b] Sampling error of total.

Table 76.--Area of commercial forest land, by county and geographic unit, Pennsylvania, 1965 and 1978.

County	1965[a]	1978	Change
	---- Thousands of Acres ----		
Allegheny	165.9	129.4	-36.5
Armstrong	198.8	219.8	+21.0
Beaver	118.4	139.0	+20.6
Butler	259.9	243.5	-16.4
Crawford	367.3	322.3	-45.0
Erie	238.6	212.1	-26.5
Greene	178.9	214.2	+35.3
Indiana	284.0	300.0	+16.0
Lawrence	83.6	77.7	- 5.9
Mercer	146.3	168.1	+21.8
Washington	193.8	209.5	+15.7
Westmoreland	287.1	298.7	+11.6
Western Unit	2,522.6	2,534.3	+11.7
Bedford	430.2	421.7	- 8.5
Blair	218.2	209.6	- 8.6
Cambria	270.3	255.4	-14.9
Fayette	387.2	304.2	-83.0
Somerset	403.8	406.2	+ 2.4
Southwestern Unit	1,709.7	1,597.1	-112.6
Cameron	247.4	240.6	- 6.8
Elk	464.8	462.3	- 2.5
Forest	247.6	247.4	- 0.2
McKean	569.9	551.5	-18.4
Potter	624.5	595.5	-29.0
Sullivan	247.0	251.4	+ 4.4
Tioga	474.4	473.6	- 0.8
Warren	449.8	459.9	+10.1
Allegheny Unit	3,325.4	3,282.2	-43.2
Centre	517.2	503.5	-13.7
Clarion	212.5	217.3	+ 4.8
Clearfield	559.2	569.1	+ 9.9
Clinton	455.4	429.0	-26.4
Jefferson	267.6	273.8	+ 6.2
Lycoming	581.4	554.0	-27.4
Venango	307.3	313.1	+ 5.8
North-Central Unit	2,900.6	2,859.8	-40.8
Dauphin	157.2	149.8	- 7.4
Franklin	198.7	199.6	+ 0.9
Fulton	186.0	178.6	- 7.4
Huntingdon	407.4	385.0	-22.4
Juniata	162.1	153.4	- 8.7
Mifflin	172.6	163.1	- 9.5
Perry	224.6	210.7	-13.9
Snyder	108.7	92.4	-16.3
Union	104.1	109.4	+ 5.3
South-Central Unit	1,721.4	1,642.0	-79.4
Bradford	324.8	380.8	+56.0
Lackawanna	187.1	187.9	+ 0.8
Susquehanna	274.1	320.0	+45.9
Wayne	270.9	307.2	+36.3
Wyoming	163.8	161.4	- 2.4
Northeastern Unit	1,220.7	1,357.3	+136.6
Carbon	186.4	160.9	-25.5
Columbia	136.9	139.4	+ 2.5
Luzerne	388.9	363.5	-25.4
Monroe	287.5	283.8	- 3.7
Montour	27.9	23.6	- 4.3
Northumberland	114.6	113.0	- 1.6
Pike	304.7	273.0	-31.7
Schuylkill	316.8	299.5	-17.3
Pocono Unit	1,763.7	1,656.7	-107.0
Adams	112.3	103.8	- 8.5
Berks	159.3	151.6	- 7.7
Bucks	102.9	79.7	-23.2
Chester	105.1	87.6	-17.5
Cumberland	105.5	109.6	+ 4.1
Lancaster	95.7	96.1	+ 0.4
Lebanon	61.2	50.2	-11.0
Lehigh	51.4	52.8	+ 1.4
Montgomery	54.1	65.5	+11.4
Northampton	69.3	56.0	-13.3
York	150.0	141.4	- 8.6
Southeastern Unit	1,066.8	994.3	-72.5
All counties	16,230.9	15,923.7	-307.2

[a] These figures differ from those published in 1965 (Ferguson 1968). A detailed explanation of these figures appears in the analytical report on the forest resources of Pennsylvania.

W-Less than 0.5 percent.

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APPENDIX

Definition of terms

Accretion. The estimated net growth of growing-stock trees that were measured during the previous inventory, divided by the length of the period between surveys. It includes the growth on trees that were cut during the period, plus those trees that died and were used.

Annual mortality trend-level. The estimated mortality of growing stock or sawtimber for a specific year (1977 for Pennsylvania) based on average rates of diameter growth and mortality for the period. This estimate is consistent with the average annual change during the period between surveys and with the current inventory.

Annual net growth trend-level. The estimated growth of growing stock or sawtimber for a specific year (1977 for Pennsylvania) based on average rates of diameter growth and mortality for the period. This estimate is consistent with the average annual change during the period between surveys and with the current inventory.

Annual removals trend-level. The estimated removals of growing stock or sawtimber for a specific year (1977 for Pennsylvania) obtained from a trend line for the period. This line is established by fitting a curve to actual removals data for several years during the period. The actual removals for the year given can vary from the trend estimate because of fluctuations in market conditions and other factors.

Average annual net growth. The change, resulting from natural causes, in growing-stock or sawtimber volume of sound wood in growing-stock or sawtimber trees during the period between surveys, divided by the length of the period. Components of average annual net growth include the increment in net volume of trees that are present at the beginning of the period and that survive to the end (accretion), plus average annual ingrowth, minus average annual mortality, and minus the net volume of trees that became rough or rotten during the period (cull increment).

Average annual removals. The net growing-stock or sawtimber volume of trees harvested or killed in logging, cultural operations--such as timber stand improvement--or land clearing, and also the net growing-stock or sawtimber volume of trees neither harvested nor killed but growing on land which was reclassified from commercial forest land to noncommercial forest land during the period between surveys. This volume is divided by the length of the period.

Board foot. A unit of lumber measurement 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent.

Coarse residues. Manufacturing residues suitable for chipping, such as slabs, edgings, and veneer cores.

Commercial forest land. Forest land producing or capable of producing crops of industrial wood (more than 20 cubic feet per acre per year) and not withdrawn from timber utilization.

Commercial species. Tree species presently or prospectively suitable for industrial wood products. Excludes species of typically small size, poor form, or inferior quality, such as hawthorn and sumac.

County and municipal lands. Lands owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

Cull increment. The net volume of growing-stock trees on the previous inventory that became rough or rotten trees in the current inventory, divided by the length of the period between surveys.

Diameter at breast height (dbh). The diameter outside bark of a standing tree measured at 4-1/2 feet above the ground.

Farmer-owned lands. Lands owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from nonfarm owners.

Federal lands. Lands (other than National Forests) administered by Federal agencies.

Fine residues. Manufacturing residues not suitable for chipping, such as sawdust and shavings.

Forest industry lands. Lands owned by companies or individuals operating primary wood-using plants.

Forest land. Land at least 10 percent stocked with trees of any size or that formerly had such tree cover and is not currently developed for nonforest use. The minimum area for classification of forest land is 1 acre.

Forest type. A classification of forest land based on the species forming a plurality of live-tree stocking. The many forest types in Pennsylvania were combined into the following major forest-type groups:

a. White pine and hemlock--forests in which white pine, red pine, or hemlock, singly or in combination, comprise a plurality of the stocking; in Pennsylvania common associates include red maple, red oaks, white oaks, beech, black cherry, and aspen.

b. Spruce/fir--forests in which spruce, fir, or tamarack, singly or in combination, comprise a plurality of the stocking; this type is rare and localized in Pennsylvania.

c. Scotch and Virginia pine--forests in which Scotch, Virginia, or pitch pines or eastern redcedar, singly or in combination, comprise a plurality of the stocking; in Pennsylvania common associates include white pine, oak, yellow-poplar, and white ash.

d. Oak/pine--forests in which hardwoods (usually white, scarlet, chestnut, northern red, or black oaks) comprise a plurality of the stocking but where Scotch, Virginia, or pitch pines or eastern redcedar comprise 25 to 50 percent of the stocking; in Pennsylvania common associates besides those listed above include red maple, black cherry, and hickory.

e. Oak/hickory--forests in which upland oaks, hickory, yellow-poplar, black walnut, or red maple (when associated with central hardwoods), singly or in combination, comprise a plurality of the stocking and in which Scotch, Virginia, or pitch pines or eastern redcedar comprise less than 25 percent of the stocking; in Pennsylvania common associates include white ash, sweet birch, black cherry, black locust, and sugar maple.

f. Oak/gum--bottomland forests in which wet-site oaks or gums, singly or in combination, comprise a plurality of the stocking; in Pennsylvania, our survey encountered only one field plot in this group, and it was dominated by swamp white oak and had associates of quaking aspen, black cherry, red maple, and white ash.

g. Elm/ash/red maple--forests in which elm, river birch, sycamore, willow, or red maple (when growing on wet sites), singly or in combination, comprise a plurality of the stocking; in Pennsylvania common associates include red oaks, white oaks, hickory, black cherry, white ash, and sugar maple.

h. Northern hardwoods--forests in which sugar maple, beech, yellow birch, black cherry, or red maple (when associated with northern hardwoods), singly or in combination, comprise a plurality of the stocking; in Pennsylvania common associates include white ash,hemlock, sweet birch, northern red oak, basswood, aspen, white oak, white pine, and hickory.

i. Aspen/birch--forests in which aspen,paper birch, or gray birch, singly or in combination, comprise a plurality of the stocking; in Pennsylvania common associates include red maple, black cherry, sugar maple, and oak.

Growing-stock trees. Live trees of commercial species classified as sawtimber, poletimber, saplings, and seedlings; that is, all live trees of commercial species except rough and rotten trees.

Growing-stock volume. Net volume, in cubic feet of growing-stock trees 5.0 inches dbh and larger, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. Net volume equals gross volume, less deduction for cull.

Hardwoods. Dicotyledonous trees, usually broad-leaved and deciduous.

Industrial wood. All roundwood products except fuelwood.

Ingrowth. The estimated net volume of growing stock trees that became 5.0 inches dbh or larger during the period between inventories, divided by the length of the period between surveys.

International 1/4-inch rule. A log rule, or formula, for estimating the board-foot volume of logs. The mathematical formula is:

$$(0.22D^2 - 0.71D)(0.904762)$$

for 4-foot sections, where D = diameter inside bark at the small end of the section. This rule is used as the USDA Forest Service Standard Log rule in the eastern United States.

Land area. (a) Bureau of Census: The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than 1/8 statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area. (b) Resources Evaluation: same as (a) except that the minimum width of streams, etc., is 120 feet, and the minimum size of lakes, etc., is 1 acre.

Logging residues. The unused portions of growing-stock trees harvested or killed in the process of logging.

Manufacturing plant residues. Wood materials that are generated when converting round timber (roundwood) into wood products. This includes slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screening. If these residues are used, they are referred to as plant byproducts.

Miscellaneous private lands. Privately owned lands other than forest-industry and farmer-owned lands.

Mortality. The estimated net volume of growing-stock trees on the previous inventory that died from natural causes before the current inventory, divided by the length of the period between surveys.

National Forest lands. Federal lands legally designated as National Forests or purchase units and other lands administered as part of the National Forest System by the USDA Forest Service.

Noncommercial forest land. Productive-reserved, urban, and unproductive forest land.

Noncommercial species. Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land. Land that has never supported forests, or land formerly forested but now in nonforest use such as cropland, pasture, residential areas, and highways.

Nonstocked areas. Commercial forest land that is stocked with less than 10 percent of minimun full stocking with growing-stock trees.

Plant byproducts. Wood products, such as pulp chips, recycled from manufacturing plant residues.

Poletimber stands. Stands stocked with at least 10 percent of minimum full stocking with growing-stock trees with half or more of such stocking in poletimber or sawtimber trees or both,and in which the stocking of poletimber exceeds that of sawtimber.

Poletimber trees. Live trees of commercial species meeting regional specifications of soundness and form and at least 5.0 inches in dbh, but smaller than sawtimber trees.

Productive-reserved forest land. Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas tree production.

Primary wood manufacturing plant. A plant that converts round timber into wood products such as woodpulp, lumber, veneer, cooperage, and dimension products.

Pulpwood. Roundwood converted into 4- or 5-foot lengths or chips, and chipped plant byproducts that are prepared for manufacture into woodpulp.

Rotten trees. Live trees of commercial species that do not contain at least one 12-foot sawlog or two noncontiguous sawlogs, each 8 feet or longer, now or prospectively, and do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees. (a) The same as rotten trees, except that rough trees do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products. Logs, bolts, or other round timber generated by harvesting trees for industrial or consumer uses.

Saplings. Live trees 1.0 through 4.9 inches dbh.

Sapling-seedling stands. Stands stocked with at least 10 percent of minimum full stocking with growing-stock trees with half or more of such stocking in saplings or seedlings or both.

Sawlog. A log meeting regional standards of diameter, length, and defect, including a minimum 8-foot length and a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods. (See specifications under Log Grade Classification.)

Sawlog portion. That part of the bole of a sawtimber tree between the stump and the sawlog top; that is, the merchantable height.

Sawlog top. The point on the bole of a sawtimber tree above which a sawlog cannot be produced. The minimum sawlog top is

7.0 inches diameter outside bark (dob) for softwoods and 9.0 inches dob for hardwoods.

Sawtimber stands. Stands stocked with at least 10 percent of minimum full stocking with growing-stock trees with half or more of such stocking in poletimber or sawtimber trees or both, and in which the stocking of sawtimber is at least equal to that of poletimber.

Sawtimber trees. Live trees of commercial species at least 9.0 inches dbh for softwoods or 11.0 inches for hardwoods containing at least one 12-foot sawlog or two noncontiguous 8-foot sawlogs, and meeting regional specifications for freedom from defect.

Sawtimber volume. Net volume in board feet, International 1/4-inch rule, of sawlogs in sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Seedlings. Live trees less than 1.0 inch dbh that are expected to survive.

Site class. A classification of forest land in terms of inherent capacity to grow crops of industrial wood. Classifications are based on the mean annual growth of growing-stock trees attainable in fully stocked natural stands at culmination of mean annual increment.

Softwoods. Coniferous trees, usually evergreen and having needles or scalelike leaves.

Stand. A group of forest trees growing on forest land.

Stand-size class. A classification of forest land based on the size class (that is, seedlings, saplings, poletimber, or sawtimber) of growing-stock trees in the area.

Standard cord. A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Fuelwood cord estimates can be derived from cubic-foot estimates of growing stock by applying an average factor of 80 cubic feet of solid wood per cord. For pulpwood, a conversion of 85 cubic feet of solid wood per cord is used because of the more uniform character of pulpwood.

State lands. Lands owned by the State or leased to the State for 50 years or more.

Stocking. The degree of occupancy of land by trees, measured by basal area and/or number of trees in a stand compared to the basal area and/or number of trees required to fully use the growth potential of the land (or the stocking standard). In the eastern United States this standard is 75 square feet of basal area per acre for trees 5.0 inches dbh and larger, or its equivalent in numbers of trees per acre for seedlings and saplings.

Two categories of stocking are used:

All live trees - these are used to classify forest land and forest types.

Growing-stock trees - these are used to classify stand-size classes.

Timber products. Manufacturing plant byproducts and roundwood (round timber) products harvested from growing-stock trees on commercial forest land; from other sources, such as cull trees, salvable dead trees, limbs, tops and saplings; and from trees on noncommercial forest and nonforest lands.

Timber removals. The growing-stock or sawtimber volumes of trees removed from the inventory for roundwood products, plus logging residues, volume destroyed during land clearing, and volume of standing trees growing on land that was reclassified from commercial forest land to noncommercial forest land. (See Table 29).

Trees. Woody plants that have well-developed stems and are usually more than 12 feet in height at maturity.

Unproductive forest land. Forest land that is incapable of producing 20 cubic feet per acre per year of industrial wood under natural conditions, because of adverse site conditions.

Unused manufacturing residues. Plant residues that are dumped or destroyed and not recovered for plant byproducts.

Upper-stem portion. That part of the main stem or fork of a sawtimber tree above the sawlog top to a diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

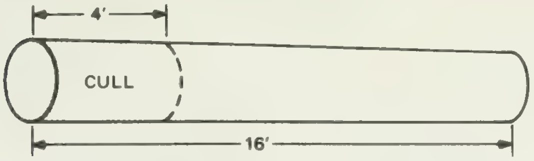
Urban forest land. Noncommercial forest land within urban areas that is completely surrounded by urban development (not parks), whether commercial, industrial, or residential.

Log-grade classification

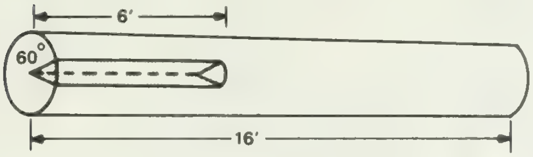
Log grades are a classification of logs based on external characteristics as indicators of quality or value. The log-grade standards and grading systems for softwoods and hardwoods used in this forest survey are shown in the following specifications:

Methods of determining scaling deduction.

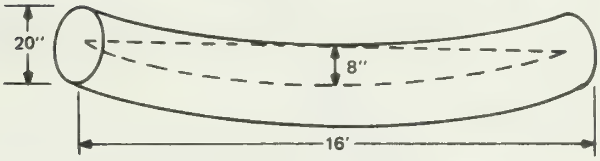
(Examples based on a 16-foot log with 20-inch scaling diameter)



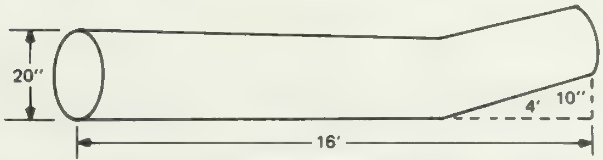
Defect section (rule 1): Percent deduction = $\frac{4}{16}$ = 25%



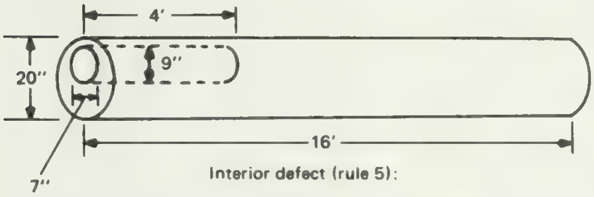
Defect section (rule 2): Percent deduction = $\left(\frac{6}{16}\right)\left(\frac{60}{360}\right)$ = 6-1/4%



Sweep (rule 3): Percent deduction = $\frac{8-2}{20}$ = 30%



Crook (rule 4): Percent deduction = $\left(\frac{10}{20}\right)\left(\frac{4}{16}\right)$ = 12-1/2%



Interior defect (rule 5):

Percent deduction = $\frac{(8)\ (10)}{(20-1)^2} \times \frac{4}{16}$ = 5-5/9%

In practice each elipse axis can be divided by (20–1)

Thus $\frac{8}{19}$ = .4, $\frac{10}{19}$ .5, and (.4) (.5) $\left(\frac{4}{16}\right)$ = 5%

From: Grosenbaugh, L.R. 1952. Shortcuts for cruisers and scalers. U.S. Dep, Agric. For. Serv. South. For Exp. Stn. Occas. Pap. 126.

STANDARD GRADES FOR HARDWOOD FACTORY LUMBER LOGS

Grading Factors		Log grades							
		F1			F2				F3
Position in tree		Butts only	Butts & uppers		Butts & Uppers				Butts & uppers
Scaling diameter, inches		13-15[a]	16-19	20+	11+[b]	12+			8+
Length without trim, feet		10+			10+	8-9	10-11	12+	8+
Required clear cuttings[c] of each of 3 best faces[d]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than ¼ of end in sound defects	15%			30%				50%
	For logs with more than ¼ of end in sound defects	10%			20%				35%
Maximum scaling	deduction	40%[e]			50%[f]				50%

End defects although not visible in standing trees, are important in grading cut logs. Instructions for dealing with this factor are contained in Forest Prod. Lab. Rpt. D 1737.

[a] Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

[b] Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

[c] A clear cutting is the portion of a face, extending the width of the face, that is free of defects.

[d] A face is ¼ of the surface of the log as divided lengthwise.

[e] Otherwise #1 logs with 41-60% deductions can be #2.

[f] Otherwise #2 logs with 51-60% deductions can be #3.

From: Vaughan, C. L., A. C. Wollin, K. A. McDonald, and E. H. Bulgrin. 1966. Hardwood log grades for standard lumber. USDA For. Serv. Res. Pap. FPL-63.

STANDARD SPECIFICATIONS FOR HARDWOOD CONSTRUCTION LOGS.[a]

Position in tree		Butt & upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements.
Sweep allowance, absolute		1/4 diameter small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of 1/3 of log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed 1/3 of log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over 1/3 of log diameter at point of occurrence, and none extends over 3 inches into included timber.[b]
Unsound surface defects		Same requirements as for sound defects if they extend into included timber.[b] No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit 1 shake not to exceed 1/4 the scaling diameter and a longitudinal split not extending over 5 inches into the contained timber.

[a] These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, then it may be necessary to subdivide the class into grades.

[b] Included timber is always square, and dimension is judged from small end.

From: Rast, E. D., D. L. Sonderman, and G. L. Gammon. 1973. A guide to hardwood log grading (Revised). USDA For. Serv. Gen. Tech. Rep. NE-1.

EASTERN WHITE PINE SAWLOG GRADE SPECIFICATIONS

GRADING FACTOR	LOG GRADE 1	LOG GRADE 2	LOG GRADE 3	LOG GRADE 4
(1) MINIMUM SCALING DIAMETER (inches)	14[1]	6	6	6
(2) MINIMUM LOG LENGTH (feet)	10[2]	8	8	8
(3) MAXIMUM WEEVIL INJURY (number)	None	None	2 injuries[3]	No limit
(4) MINIMUM FACE REQUIREMENTS	Two full length or four 50% length good faces.[4] (In addition, log knots on balance of faces shall not exceed size limitations of grade 2 logs.)	No GOOD FACES REQUIRED Maximum diameter of log knots on three best faces: SOUND RED KNOTS not to exceed 1/6 scaling diameter and 3 inch maximum. DEAD OR BLACK KNOTS including overgrown knots not to exceed 1/12 scaling diameter and 1½ inch maximum.	SOUND RED KNOTS not to exceed 1/3 scaling diameter and 5 inch maximum. DEAD OR BLACK KNOTS including overgrown knots not to exceed 1/6 scaling diameter and 2½ inch maximum.	Includes all logs not qualifying for No. 3 or better and judged to have at least one-third of their gross volume in sound wood suitable for manufacture into standard lumber.
(5) MAXIMUM SWEEP OR CROOK ALLOWANCE (percent)	20	30	40	66⅔
(6) MAXIMUM TOTAL SCALING DEDUCTION (percent)	50	50	50	66⅔

After the tentative log grade is established from face examination, the log will be reduced in grade whenever the following defects are evident:

(7) CONKS, PUNK KNOTS, AND PINE BORER DAMAGE ON BARK SURFACE[5]

Degrade one grade if present on one face.
Degrade two grades if present on two faces.
Degrade three grades if present on three or more faces.

(8) LOG END DEFECTS: RED ROT, RING SHAKE, HEAVY STAIN AND PINE BORER DAMAGE OUTSIDE HEART CENTER OF LOG[5]

Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated below:
Degrade one grade if present in 2 quarters of log ends.
Degrade two grades if present in 3 or 4 quarters of log ends.
Degrade three grades if present in 5 or more quarters of log ends.

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[1] 12 and 13 inch logs with four full length good faces are acceptable.
[2] 8 foot logs with four full length good faces are acceptable
[3] 8 foot No. 3 logs limited to one weevil injury
[4] Minimum 50% length good face must be at least 6 feet
[5] Factors 7 and 8 are not cumulative (total degrade based on more serious of the two). No log to be degraded below grade 4 if net scale is at least one-third gross log scale.

From: Ostrander, M. D., and R. L. Brisbin, 1971. Sawlog grades for eastern white pine. USDA For. Serv. Res. Pap. NE-205.

SOUTHERN PINE SAWLOGS

Grade 1. Logs with 3 or 4 clear faces.[1] Code 1.

Grade 2. Logs with 1 or 2 clear faces. Code 2.

Grade 3. Logs with no clear faces. Code 3.

After the tentative log grade is established from above, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one third (1/3) the diameter inside bark at small end. This is the final grade if there is no evidence of heart rot.

2. *Heart rot.* Degrade any tentative 1 or 2 log one grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

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[1] A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than one-half inch in diameter, overgrown knots of any size, holes more than one-fourth inch in diameter. The faces may be rotated if necessary to obtain the maximum number of clear ones.

From: Schroeder, J. G., R. A. Campbell, and R. C. Rodenbach. 1968. Southern pine sawlogs for yard and structural lumber. USDA For. Serv. Res. Pap. SE-39.

Commercial tree species of Pennsylvania

Scientific Name[a]	Common Name	Occurrence[b]
	SOFTWOODS	
Juniperus virginiana	eastern redcedar	vr
Larix laricina	tamarack (eastern larch)[c]	r
Picea abies	Norway spruce[d]	r
P. glauca	white spruce[d]	vr
P. mariana	black spruce	vr
P. rubens	red spruce	vr
Pinus banksiana	jack pine[d]	r
P. echinata	shortleaf pine	vr
P. pungens	Table-Mountain pine	vr
P. resinosa	red pine	c
P. rigida	pitch pine	c
P. strobus	eastern white pine	c
P. sylvestris	Scotch pine[d]	c
P. virginiana	Virginia pine	c
Tsuga canadensis	eastern hemlock	vc
	HARDWOODS	
Acer rubrum	red maple (soft)[c]	vc
A. saccharinum	silver maple	r
A. saccharum	sugar maple (hard)[c]	vc
Betula alleghaniensis	yellow birch	c
B. lenta	sweet birch (black)[c]	c
B. nigra	river birch	vr
B. papyrifera	paper birch(white)[c]	r
Carya spp.	hickory	c
Castanea dentata	American chestnut	vr
Celtis occidentalis	hackberry	vr
Cornus florida	flowering dogwood	r
Diospyros virginiana	common persimmon	vr
Fagus grandifolia	American beech	c
Fraxinus americana	white ash	c
F. nigra	black ash	vr
F. pennsylvanica	green ash	r
Gleditsia triacanthos	honeylocust	vr
Gymnocladus dioicus	Kentucky coffeetree	vr
Ilex opaca	American holly	vr
Juglans cinerea	butternut	r
J. nigra	black walnut	r

Liquidambar styraciflua	sweetgum (red gum)[c]	vr
Liriodendron tulipifera	yellow-poplar (tulip tree)[c]	c
Magnolia acuminata	cucumber tree	r
Nyssa sylvatica	blackgum (black tupelo)[c]	c
Platanus occidentalis	American sycamore	r
Populus deltoides	eastern cottonwood	vr
P. grandidentata	bigtooth aspen	c
P. tremuloides	quaking aspen	c
Prunus serotina	black cherry	vc
Quercus alba	white oak	vc
Q. bicolor	swamp white oak	r
Q. coccinea	scarlet oak	c
Q. falcata var. *falcata*	southern red oak	vr
Q. imbricaria	shingle oak	vr
Q. macrocarpa	bur oak	vr
Q. muehlenbergii	chinkapin oak	vr
Q. palustris	pin oak	r
Q. phellos	willow oak	vr
Q. prinus	chestnut oak	vc
Q. rubra	northern red oak	vc
Q. stellata var. *stellata*	post oak	vr
Q. velutina	black oak	c
Robinia pseudoacacia	black locust	c
Salix nigra	black willow	vr
Tilia americana	American basswood	c
Ulmus americana	American elm	c
U. rubra	slippery elm	c
U. thomasii	rock elm	r

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[a] Names according to: Little, Elbert L., Jr. 1979. Checklist of United States trees (native and naturalized). U.S. Dep. Agric., Agric. Handb. 541. Washington, D.C. 375 p.

[b] Occurrence is based on the frequency of tally of commercial species 5.0 inches dbh or larger on forest survey field plots: vr - very rare (<0.05%), r - rare (0.05 to 0.49%), c - common (0.5 to 4.9%), and vc - very common (>5.0%).

[c] Names in parentheses are other frequently used names.

[d] Species introduced into Pennsylvania.

Metric equivalents of units used in this report

1 acre = 4,046.86 square meters or 0.404686 hectares
1,000 acres = 404.686 hectares
1,000,000 acres = 404,686 hectares
1,000 board feet = 3.48 meters[a]
1 cubic foot = 0.028317 cubic meters
1,000 cubic feet = 28.317 cubic meters
1,000,000 cubic feet = 28,317 cubic meters
1 cord (wood, bark, and airspace) = 3.6246 cubic meters
1 cord (solid wood, pulpwood) = 2.4069 cubic meters
1 cord (solid wood, other than pulpwood) = 2.2654 cubic meters
1,000 cords (pulpwood) = 2,406.9 cubic meters
1,000 cords (other products) = 2,265.4 cubic meters
1 inch = 2.54 centimeters or 0.0254 meters
1 foot = 30.48 centimeters or 0.3048 meters
Breast height = 1.4 meters above ground level
1 mile = 1.609 kilometers
1 square foot = 929.03 square centimeters or 0.0929 square meters
1 square foot per acre basal area = 0.229568 square meters per hectare

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[a] While 1,000 board feet is theoretically equivalent to 2.36 cubic meters, this is true only when a board foot is actually a piece of wood with a volume 1/12 of a cubic foot. The International 1/4-inch log rule is used by the USDA Forest Service in the East to estimate the product potential in board feet. The reliability of the estimate, using a conversion, will vary with the size of the log measure. The conversion given here, 3.48 cubic meters, is based on the cubic volume of a log 16 feet long and 15 inches in diameter inside bark (dib) at the small end. This conversion could be used for average comparisons when accuracy of 10 percent is acceptable. Since the board foot unit is not a true measure of wood volume and since products other than dimension lumber are becoming important, this unit may eventually be phased out and replaced with the cubic meter unit.

Considine, Thomas J., Jr., and Douglas S. Powell.

1980. Forest Statistics for Pennsylvania--1980.
Northeast. For. Exp. Stn., Broomall, Pa. 88 p.
(USDA For. Serv. Resour. Bull. NE-65)

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A statistical report on the third forest survey of Pennsylvania conducted in 1977 and 1978. Statistical findings are based on data from remeasured 1/5-acre plots and both remeasured and new 10-point variable-radius plots. The current status of forest-land area, timber volume, and annual growth and removals is presented. Timber products output by timber industries, based on a 1976 updated canvass of manufacturers, is presented. //

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